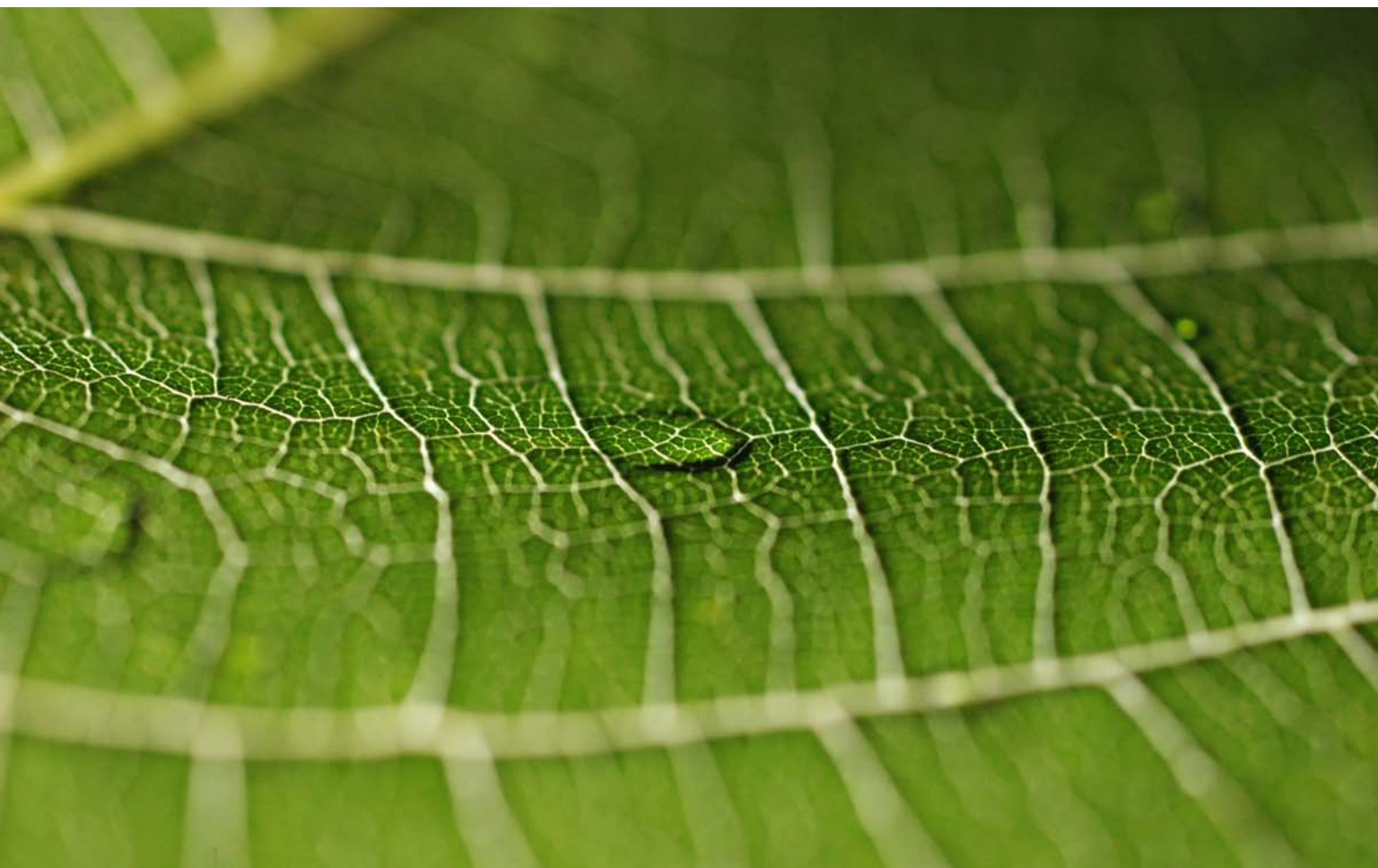


Act Locally:

Implementing Sustainability in Local Governments





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How to Use this Handbook

The aim of this handbook is to provide an overview of different approaches to sustainability planning that are being used by local governments across the United States. The goal of these efforts is to lower costs, improve environmental performance, and meet present needs without compromising the ability of future generations to meet their own needs.

This handbook is not a definitive collection of answers. Instead, it is a collection of good examples, useful tools, and successful approaches for meeting the varied challenges that each community faces. There is no magic bullet; however, a holistic plan that examines and coordinates relevant government activities will foster the most successful outcomes.

One of the strongest lessons from our research is that significant environmental, social, and economic gains can be made via improved planning. Whether you read the handbook start-to-finish, or turn to the key issue areas that interest you, we hope you will find this guide useful and informative.



1 Introduction to Sustainability Planning

Carpenters and tailors know the old motto well: measure twice, cut once.

In an era of growing population, increasing economic competition, and environmental challenges ranging from climate change to air pollution, decreasing water levels to rising energy costs, this motto has never been more true. Intelligent planning is essential to our future and the well being of our communities.

Planning in the 21st Century, however, goes beyond mere zoning or general land use issues. Increasingly, communities are looking at a wider range of issues — from traditional concerns to issues not previously considered by most local governments. Many local governments, ranging from towns and cities to counties and regional partnerships, are finding that the most effective planning takes a long-term, comprehensive approach to a wider range of environmental, health, and development issues with the goal of improving overall sustainability.

What is sustainability? The United States Environmental Protection Agency (EPA), echoing the language of the 1987 Brundtland Report, defines sustainability as

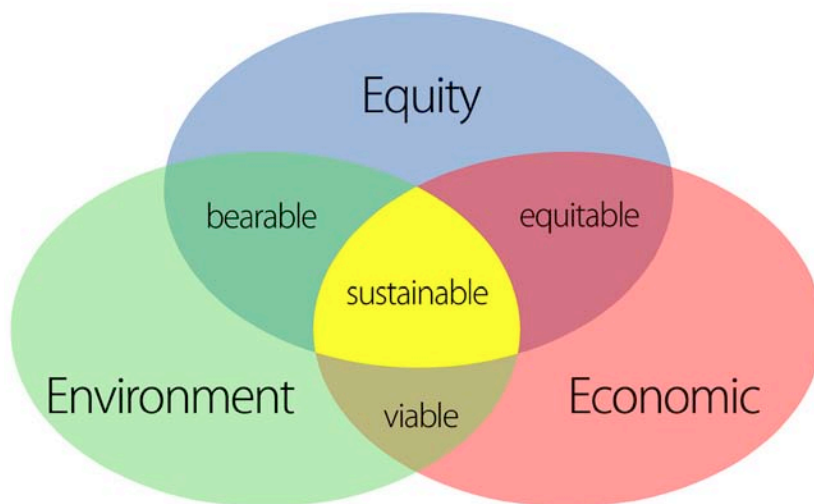
“meeting the needs of the present without compromising the ability of future generations to meet their own needs” (EPA 2008).

In other words, sustainability is a way of balancing the needs of people today with the future needs of our children and the natural systems that sustain all life.

Another take on sustainability is to reconcile economic growth with environmental and social equity concerns through the promotion of economical, low-impact, and fair development. Thus,

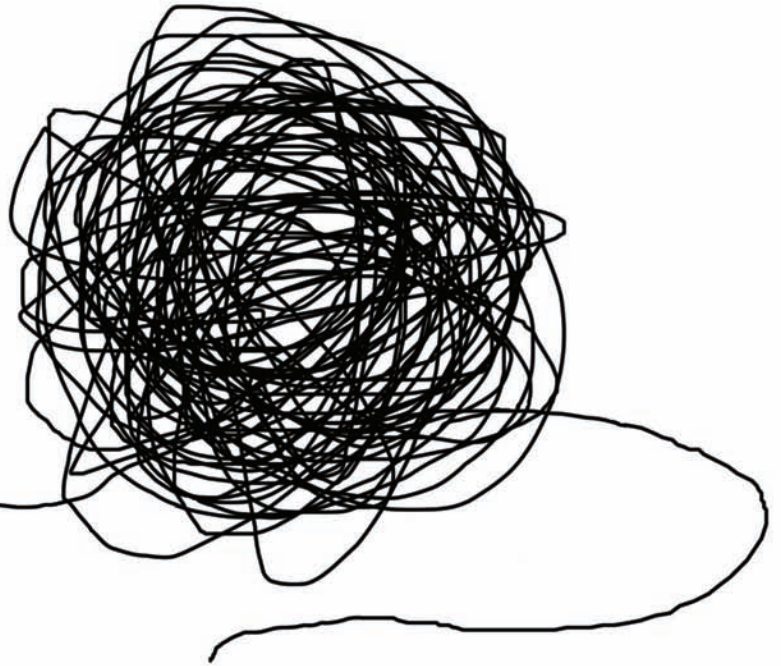
sustainable development is often said to be concerned with the “three E’s”: economy, environment and equity.

Municipal sustainability planning applies this mindset to the critical resource issues that communities face everyday — planning for traffic and transportation, protecting against storms and other hazards, ensuring clean supplies of water and reliable supplies of energy,



dealing with solid waste and runoff, and protecting natural open spaces.

How can sustainability planning bring real-world benefits to our towns and cities? What are the best sustainability practices currently in use? How can a community move from an idea to a plan to successful action? This handbook, based on a survey of over two dozen cities, towns, and counties across the United States, will attempt to provide some answers to these questions.



Trends in Sustainability Planning

From our research, several trends emerge:

- Sustainability planning is increasingly moving to the mainstream. Once the domain of only the “greenest” cities, sustainability planning is being used by cities and towns across the nation like Fresno, California.

Sustainability planning is increasingly being used by smaller communities as well as by large ones.

Although plans like New York City’s PlaNYC are well-known, smaller cities like Cleveland, Ohio, towns like Sedona, Arizona, and counties like Westchester County, New York are finding that they too can benefit from an integrated approach to resource and community planning.

- Municipal sustainability planning can produce tangible benefits such as helping a community lower energy costs, secure

sustainable supplies of water, reduce air pollution, and encourage new economic development.

- There is a growing array of tools, techniques, and approaches that are being generated by innovative communities of every size and type. Although every area of the US has its own challenges and resources, there are solutions and ideas that can be adapted to the needs of any community.

Communities face a mix of global concerns, such as those related to climate change, population growth, and high fuel prices as well as regional and local issues such as water shortages or floods. Given this, no one set of sustainability measures are right for every community.

There are, however, a host of lessons we can take from efforts already underway and a few key principles we can apply. Overall, the most effective sustainability planning assesses current conditions, devises a long-term comprehensive approach, and creates real benefits for people today.

"Sustainability planning is increasingly moving to the mainstream."



BROADWAY

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DR MARTIN LUTHER KING JR
BOULEVARD

STOP
HERE ON
RED
SIGNAL

Broadway



2

Getting Started, Building Momentum and Keeping Direction

(2a) Assessing the Challenge

The first step to any comprehensive planning effort is to assess your community's strengths and weaknesses as well as current and future needs. Although any assessment is a combination of art and science, there are tools, such as Environmental Management Systems, that can help ensure your assessment is complete and thorough. We discuss these tools in detail in the next section of this chapter.

When evaluating your own needs, benchmarking — that is, looking at the best practices of other, similar communities — is always a useful exercise. This handbook includes a series of case studies as well as many internet-based resources that we hope will provide useful guidance for your sustainability planning efforts.

Needless to say, your community is characterized by a set of unique features — from its climate and topography to local development patterns. The issues you focus on will determine the structure of your local sustainability plan, but most of the municipal plans discussed in this handbook include the following topics:

- Transportation
- Land use planning
- Open space protection
- Energy, air quality, and climate change considerations
- Water supply, stormwater, and wastewater issues
- Solid waste and recycling

The issues you wish to tackle may include only some of these topics or might extend to other concerns, but one goal is to be comprehensive — many of these issues are interconnected. For example, effective open space protection can reduce flooding from storms; better transportation can reduce air pollution and energy use.

Environmental threats, economic pressures, and changing regulations often spur or drive planning efforts, so it's worth thinking through several related issues at the same time:

- What impacts are the most serious?
- What are the potential regulatory requirements that currently apply and that may be developed down the line?
- What is the potential for mitigation (or prevention) of a given hazard or how difficult or easy will it be to implement change?
- What are the possible synergies that can result from tackling a range of issues at the same time? (For example, can improved open space protection preserve biological resources and reduce flood risks? Can changes to a government's vehicle fleet lower its energy costs and improve local air pollution?)

TIP: As your list grows longer, you may wish to employ a spreadsheet or database of some kind.

Using Environmental Management Systems

Any successful planning effort will have to balance breadth with depth. Although it is critical to plan in an integrated and comprehensive fashion, taking on too many topics or challenges can stymie an effort from moving forward. But whatever issues are eventually chosen for the larger plan, it's important to start with a broad view that systematically maps the most significant concerns. This is where an Environmental Management System (EMS) can come in handy.

What is an EMS?

An Environmental Management System is a continuous systematic approach to managing and reducing environmental impact.

By addressing root causes and integrating environmental aspects into everyday operations, environmental stewardship becomes a priority across the entire organization. Every EMS follows a basic four-step model:

1. The Plan phase includes analyzing current environmental impacts and legal requirements and then setting appropriate environmental goals and objectives.
2. The Do phase includes implementing specific programs and processes to meet objectives and targets. Tasks might include training employees and establishing operational controls. Being precise about assigning responsibilities to ensure accountability is a must.

3. The Check phase includes internal auditing, monitoring progress, assessing successes and failures, identifying areas for improvement, and benchmarking. Evaluating employee understanding of the system and retraining employees when necessary is key to keeping the system current and useful.

4. The Act phase includes reviewing progress, performing management reviews, and implementing improvements to the plan, which can start the planning process anew.

General information on the topic regarding an EMS can also be found on EPA's website:

<http://www.epa.gov/ems/index.html>

As the issues a municipality seeks to manage multiply, an EMS becomes more useful. An EMS can address both regulatory demands, such as complying with air or water quality standards, and non-regulated issues, such as traffic congestion or energy consumption.



The EPA has found that an EMS can help municipalities:

1. Improve environmental performance and enhance regulatory compliance;
2. Prevent pollution and conserve resources;
3. Reduce environmental hazards;
4. Attract new businesses and create new markets;
5. Increase energy efficiency and reduce costs;
6. Enhance employee morale and awareness as well as recruiting;
7. Enhance a community's image with the public, regulators, lenders, and investors; and
8. Qualify a community for recognition and incentive programs such as the EPA Performance Track Program (<http://www.epa.gov/perfrac>).

Because many robust EMS frameworks already exist, there's no need to reinvent the wheel. In fact, one of the benefits of relying on a pre-existing EMS is taking advantage of the experience embodied in the system.

Recommended Resource:

Public Entity EMS Resource Center. This collaboration between the US EPA and the Global Environment and Technology Foundation has a range of useful resources.
<http://www.peercenter.net/>

Additional Resources:

Clean Air Climate Protection (CACP) Software. This tool created by Local Governments for Sustainability (ICLEI) is used by the US Conference of Mayors agreement and is designed to help local governments formulate climate action plans. The tool can compute emissions numbers and calculate cost savings.

<http://www.iclei-usa.org/action-center/tools/cacp>

Climate and Air Pollution Planning Assistant (CAPPA). This tool, expected to be ready late in 2008, is a more comprehensive planning support tool.

<http://www.iclei-usa.org/action-center/tools/cappa>

ISO 14004:2004 and ISO 14001:2004. These frameworks were developed by the International Organization for Standardization (ISO).

http://www.iso.org/iso/iso_catalogue/management_standards/iso_9000_iso_14000/iso_14000_essentials.htm

Sustainability Reporting Framework and Guidelines. Although primarily for businesses, this product of the Global Reporting Initiative can help communities and organizations track and report key indicators.

<http://www.globalreporting.org/About-GRI/>

LEED® for Neighborhood Design. The US Green Building Council (USGBC), known for its energy-efficient and environmentally-conscious construction and operation standards, is pilot testing a new LEED® (Leadership in Energy and Environmental Design) system for neighborhood design that should be available in 2009.
<http://www.usgbc.org/DisplayPage.aspx?CMSPageID=148>

(2b) Assessing Vulnerabilities and Integrating Emergency Planning

Along with understanding the unique challenges and resources of your community, protecting against natural hazards should be a key planning priority. Natural hazards will always be present to some degree, but hazards don't have to become disasters. By assessing your community's vulnerabilities and implementing mitigation strategies, the potential impacts can be reduced.

Risk is determined by evaluating the potential damage (hazard) and assessing the susceptibility to the impact (vulnerability) (UN 2007). Although evaluating risk is often more qualitative than quantitative, it can be useful to think about risk as a product of the hazard multiplied by the vulnerability. Risk assessment usually follows a three-step approach:

1. Identifying the nature, location, intensity, and probability of the key threats in your area.
2. Determining the degree of vulnerabilities to those threats.
3. Identifying the resources available to manage or respond to the threats (UN 2007).

The first step of risk assessment involves reviewing the technical features of likely hazards, such as their location, intensity, and likely frequency. The second step involves looking at how vulnerable a given area is to such hazards.

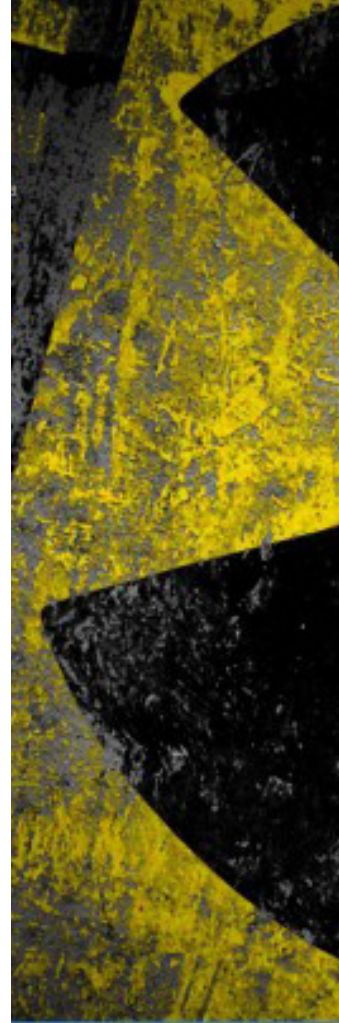
When evaluating vulnerability to a particular risk, it's common to consider:

- Land use patterns, engineering of key infrastructure, and architecture of the built environment
- Social factors relating to the well-being of individuals, communities, and society
- Economic factors, with an understanding that distressed and low-income neighborhoods may have a more limited capacity to recover
- Environmental factors including especially how the degradation of natural areas, like wetlands, can increase the impacts of hazards such as flooding

General information on preparing for disaster, determining risks, and planning for emergencies can be found on the Federal and Emergency Management Agency (FEMA) website

<http://www.fema.gov/plan/index.shtm>

Particular care should be taken to evaluate how the risks associated with a natural





hazard can be potentially compounded by the existence or condition of human-made infrastructure — such as a flood causing an overflow of a sewage treatment plant.

Although you are more than likely to be well aware of the most common local risks in your area, it's worth considering global threats such as climate change and population growth.

An emergency preparedness strategy should, ideally, also consider other pos-

sible threats such as the potential for an accidental or intentional chemical release, explosion, outbreak of disease, or even, depending on the area, radiological release. Since agencies in your area, such as police, fire, and emergency management are already tracking and evaluating these threats, a multi-stakeholder approach that brings in relevant local and regional agencies is critical.

Recommended Resource:

Community Vulnerability Assessment Tool. In collaboration with the Federal Emergency Management Agency, the National Oceanic and Atmospheric Administration (NOAA) produced this tool to determine and prioritize vulnerability hazards. <http://www.csc.noaa.gov/products/nc-haz/startup.htm>

Additional Resources:

HAZUS

The Federal Emergency Management Agency developed this HAZUS (Hazards US) software tool for estimating potential losses from natural hazards. <http://www.fema.gov/hazus>

Climate Change Science Program

This is a portal to federal research on climate change impacts across all agencies. <http://www.climatescience.gov/>

Regional Climate Modeling Tool

NOAA, among other organizations, has been looking at the potential regional impacts of climate change via this tool's modeling capabilities. <http://www.ncar.ucar.edu/research/climate/regional.php>

More detailed information on accounting for a range of hazards is covered in the hazard mitigation section of this handbook.

(2c) Using Existing Networks and Resources

As you begin to create your sustainability plan, it's a good idea to evaluate what is already been done in your area. Are other agencies already studying aspects of the issue? Is there a local organization protecting open space, a business association analyzing the impacts of growth, or a school program focusing on stream clean-ups or water quality?

A successful plan should respond to the issues of your community, but, remember, there is no need to re-invent the wheel.

Instead, organize a meeting with the coordinators of any such existing projects to tackle the broader issues of municipal sustainability planning.

Chances are that at least some plans, studies, and committees have been created over the years. This is an ideal opportunity to compile resources and documents that your locality has created and worked on over the past few years and to see what work has already been done.

Annual reports for water and energy consumption as well as wastewater and solid waste generation should be readily available from local and regional utilities. Land use planning and environmental documents such as general plans, open space preservation plans, and natural resource protection plans and their respective environmental impact statements/reports, will also be useful in identifying what's been done and what needs to be done. Anything older than five to ten years may need to be updated, but even older efforts can provide worthwhile guidance and data, which will come in handy later

when targets are to be set and progress measured.

Once you've taken a survey of ongoing efforts and historical data, looking at local capacity to manage the planning process is the logical next step. Strong leadership of the planning effort is essential to the success of the sustainability plan. This role can successfully be taken on by an elected official, a planning or community development department in the local government, a community-based commission, a prominent local business, or a hybrid approach that combines all of these stakeholders.

(2d) Building a Coalition, Educating the Public

Successful planning efforts are typically broad-based and encourage participation by the whole community. By partnering with citizens and existing groups, the effects of your sustainability plan can be amplified and staff workload can be minimized.

Citizen volunteers are a key group to consider as part of your partnership, since they themselves directly benefit and can help make the public case to their neighbors and friends.

Organizing volunteer days and getting citizens involved in the planning process is not only helpful but required in many cases (such as when dealing with land use planning).

Forming ad hoc committees or commissions, overseen by government officials, is another effective way to address specific environmental planning issues while allowing interested citizens to contribute specialized expertise. Inviting community members to participate in meetings is a good way to recruit members. The Westchester County Global Warming Task Force in New York, for instance, allows interested citizens to work on specific issues without being permanent members.

Local environmental groups are another potential set of organizations that communities can partner with during the planning process. Environmental groups often bring specialized expertise in issues such as watershed protection or smart growth planning. Ensuring that all local environmental concerns are considered can help create broad-based support for the planning process. Some examples of this are Denver, Colorado involving the FrontRange Earth Force in its planning process and Westchester County, New York working with the Natural Resource Defense Council (NRDC) and Riverkeepers, among other groups.

Because environmental sustainability and the long-term economic viability of a community are linked, businesses, business associations, and chambers of commerce are also important partners. Resource and planning issues, such as the availability of water, the price of energy, and accessibility to transportation, are often of critical importance to the local business community. In addition, local businesses can provide both technical resources and funding for your sustainability planning process.

Along with citizens, nonprofits, and business groups, other government agencies are key to consider. For instance, a city or town may want to — or in some cases be required to — involve regional or state agencies. Outside agencies may be able to provide a wealth of resources and assistance, including grants, loans, or other financing.

Academic organizations are also possible partners. As members of the community, universities, colleges, and technical schools may have a direct interest in the local government sustainability planning process. In addition, these organizations can provide technical resources, research support, and venues for public discussions. For example, the Montgomery County Greenhouse Gas (GHG) Task Force was developed as the result of a project conducted by Pennsylvania State University graduate students.

Faith and service organizations, transportation advocacy groups, and labor unions can also make potential partners depending on the interests of local groups and the needs of the community.

Just as there is a balancing act between creating a comprehensive plan and creating a workable plan, coalitions should be balanced between creating broad support and not getting so large as to be unwieldy.

Educating Colleagues and the Public

Once you've taken the lay of the land, looked at applicable planning approaches, and assessed potential partners, articulating the case to your city, town, or county government becomes essential. As part of your internal outreach, you may need to create a project brief that outlines possible benefits, looks at costs, and creates a timeline for major milestones.

Some communication lessons from the sustainability plans we analyzed include:

- Creating and circulating a clear, concise project brief that discusses top-level goals and is not too technical is important
- Emphasizing the unique challenges of your area and benefits to your community helps make the abstract idea of planning more tangible and closer to home

- The best plans make a combined appeal to civic culture, area values, economic concerns, and local benefits

One of the most significant challenges in discussing sustainability is creating greater public awareness about the interdependence of the environment, the economy, and community life and hammering home that these things don't conflict with each other. Cooperation between public agencies, non-profit organizations, and the private sector can create compelling messages and materials to improve public understanding of the issues at hand and the planning process itself. Effective outreach materials should be specific to your region and based on the actual experiences of people, organizations, and the government. Available resources for educating staff and the public include:

Place Matters

This is an educational website for citizen engagement and community education.
<http://www.placematters.org>

Sustainable Communities Network

This website offers several resources and links to organizations working on sustainability education.
<http://www.sustainable.org/living/education.html>

Education for Sustainability

This website was created by the Center for a Sustainable Future and provides specific recommendations to reach all segments of the population.
<http://www.ffof.org/pcsd/toc.html>

Education for Sustainable Development Toolkit

This website has a section with exercises to explain the concept of sustainable development and create relevant curriculum for local school systems.
<http://www.esdtoolkit.org>

(2e) Finding the Money

One of the considerations concerning the implementation of any governmental program, including sustainability efforts, is how to pay for it. Just as each municipality's sustainability plan will vary, so will the approach towards funding.

There is no right or wrong way to pay for sustainability programs.

However, an analysis of multiple sustainability plans does reveal several common approaches:

- Effective plans demonstrate how spending on a planning or implementation activity — such as auditing and reducing energy use — can save money across departments and over time;
- Some municipalities secure grants and donations;
- Partnerships with business and local non-profit organizations can help defray costs and provide technical and personal resources; and
- Smart sustainability planning can help municipalities save money by improving regulatory compliance and reduce future costs.

One of the most frequently cited and successful sources of sustainability funding are programs that result in cost savings. In some cases, upfront investment in long-lasting infrastructure — where projects are amortized over decades — can be offset by long-term savings.

According to the United States Conference of Mayors (2006), typical cost savings come from:

- Energy reduction strategies (e.g. on-site renewable energy or replacement of lighting with high-efficiency alternatives);





- Purchasing low-energy appliances
- Green building projects
- Vehicle Emissions Reduction Programs (VERP) — such as replacing leaking gas caps
- Arbor projects that add shade or create natural stormwater buffers
- Recycling programs
- Education and training
- Traffic-signal optimization

Sometimes grants can fund the creation of sustainability plans. Some of the most popular routes to obtaining grants are via EPA, the Department of Energy, and state departments of environmental protection. EPA provides scores of grants for a variety of projects for municipalities of all sizes and types. For example, the Burlington Legacy Project in Vermont was funded in part by an EPA Sustainable Development Challenge Grant.

Public-private partnerships are also a potentially valuable financing tool. The United States Conference of Mayors provides numerous examples of how municipalities have teamed with non-governmental organizations, utilities, water boards, businesses, and other partners. Not only do such efforts frequently find funding for achieving sustainability goals, but they also help foster support for planning efforts.

Weighing the benefits and costs of a given approach is a frequent first-step in the budgetary process, but it is rarely a straightforward process — particularly in regard to environmental concerns. How does one quantify the value of clean air, open space, a pristine shoreline, quality of life, or, for that matter, human life — especially those that are generations away? One broad rule of thumb is that it's usually best to start with the proverbial low-hanging fruit — targeting the most pressing problems with the most direct and cost-effective solutions — and then

use an EMS or other systematic planning approach to continue to improve performance over time.

Recommended Resource:

To learn more about EPA and other federal grant opportunities, go to:
<http://www.grants.gov>

TIP: On the grants.gov homepage, if you click on "Find Grant Opportunities" and "Email subscription," you can register your search parameters and automatically receive an e-mail notification of new grant opportunities.

Additional Resources:

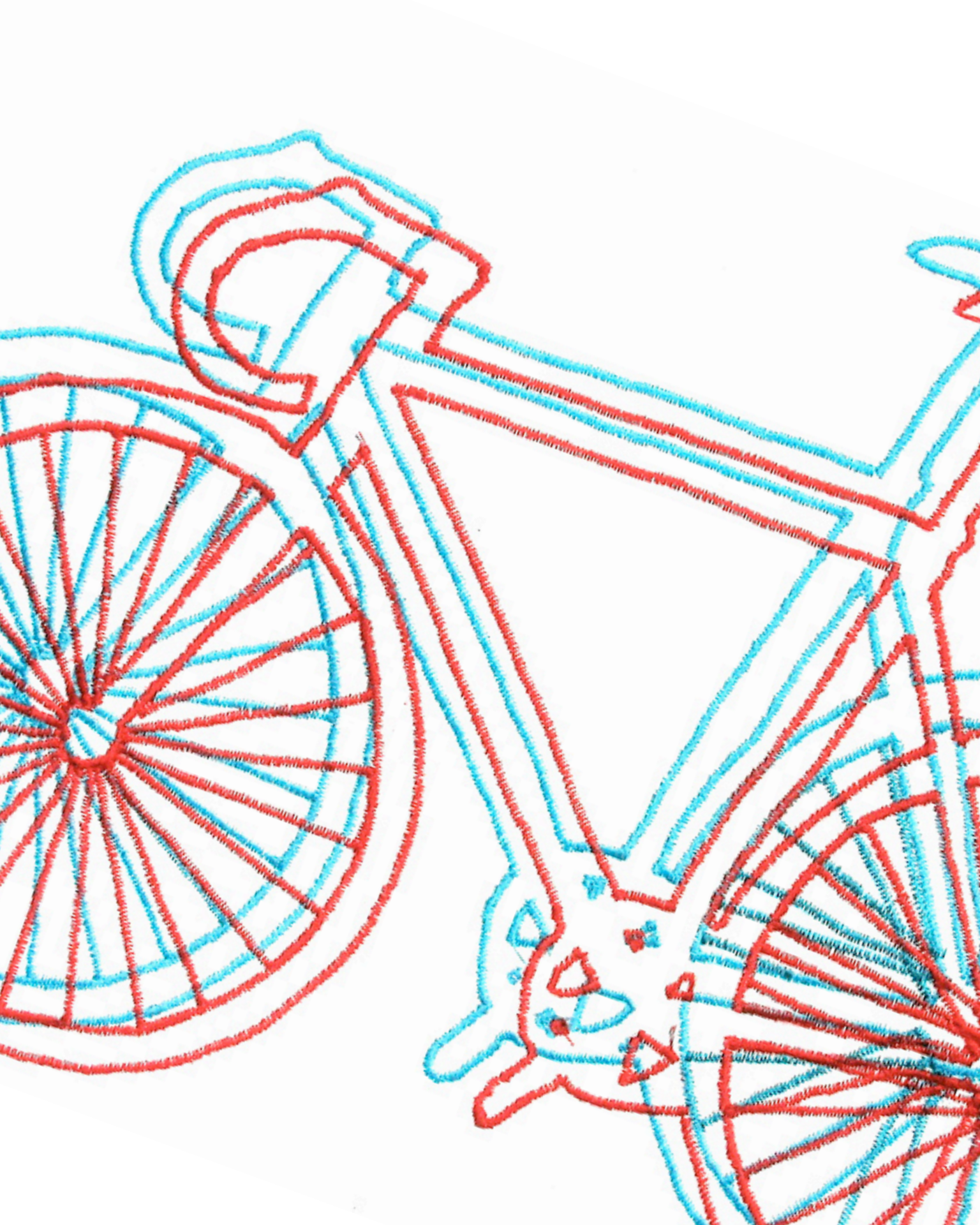
The US Department of Energy (DOE) database of incentives for renewables and efficiency has detailed information on state and local incentives and funding programs:
<http://www.dsireusa.org/>

US Department of Energy Funding for Energy Efficiency is located at:
<http://www1.eere.energy.gov/financing/>

The Federal Department of Transportation has information on how to get funding for bicycle and pedestrian projects:
<http://www.fhwa.dot.gov/environment/bikeped/bp-broch.htm#funding>

The US Department of Housing and Urban Development offers incentives for redevelopment via its Home Ownership Zones:
<http://www.hud.gov/offices/cpd/affordablehousing/programs/hoz/>

EPA's Guidebook of Financial Tools: Paying for sustainable environmental systems is located at:
<http://www.epa.gov/efinpage/efinfin.htm>



A decorative graphic on the left side of the page consists of a series of red and blue lines. These lines are drawn with a thick, textured marker, creating a sense of depth and movement. The lines start from the bottom left and fan out towards the top right, resembling a stylized map or a network of paths. The red lines are more numerous and form a dense web, while the blue lines are fewer and more distinct, often running parallel to or intersecting the red lines. The overall effect is a vibrant, abstract pattern that adds visual interest to the page.

3

Areas of Opportunity

(3a) Transportation

In 2005, according to the US Department of Transportation, traffic congestion resulted in 4.2 billion hours of travel delay, 2.9 billion gallons of wasted fuel, and a net urban congestion cost of nearly \$80 billion (RITA 2008).

The social and environmental impacts of congestion, such as the value of lost time and extra air pollution created by idling, are no less important.

Reducing congestion, however, is no longer just a matter of building bigger and wider roads. A more innovative approach that adds more public transportation options and reduces the need for endless driving is called for (RITA 2008).

The good news is that communities that have successfully added public transportation and revitalized downtown areas have often reaped big rewards including reduced commute times, improved air quality, and a reduction in greenhouse gas emissions.

Other less quantifiable benefits include reduced health risks, improved integration of disparate neighborhoods, and increased safety for pedestrians, cyclists, and drivers alike. Commuters who have public transportation options are often able to save money — especially as fuel prices continue to increase. Promoting walking and bicycling are common strategies.

Best Practices and Solutions

Planning approaches range from simple changes made to existing infrastructure to comprehensive efforts to rethink how a region travels. Although the creation of major new projects, such as the introduction of light rail, can take time and require major capital spending, they often pay for themselves over time and can be linked with other large-scale projects to revitalize downtowns and reshape development patterns.

There is a range of feasible and cost-effective transportation approaches that are worth considering. These include:

- Car-pooling programs
- Creating or upgrading bike lanes, bike paths, and walking paths to encourage non-motorized transportation
- Working with local businesses to stagger delivery and commute times, and to encourage telecommuting
- Expanding availability of alternative public transportation services

- Optimizing the routes, timing, and methods of existing transportation services
- Promoting use of public transportation with incentives
- Upgrading public transportation infrastructure to make it more welcoming
- Developing “transportation corridors” between communities
- Linking up existing public transportation services with neighboring communities; and
- Offering public transportation along or parallel to existing highway/arterial corridors.

To develop a strategic action plan for sustainable transportation, communities may need to establish a dedicated planning group to work jointly with local, state, and federal agencies.

Measuring Success

Communities may evaluate their progress by measuring operational effectiveness and efficiency, environmental impacts, behavioral changes in public transportation choices, and infrastructure security (Jeon et al. 2005). Some specific indicators could include:

- Reduction in fossil fuel consumption
- Reduction in GHG emissions
- Reduction in traffic congestion
- Reduction in commute times
- Miles of bike lanes
- Flow along key streets
- Surveys of rider or driver satisfaction
- Number of people carpooling

Recommended Resource:

EPA Transportation and Air Quality program regulates air pollution from all kinds of motor vehicles and engines and encourages travel choices that minimize emissions, has lots of useful information for state and local governments on its website, including easy-to-use calculators and modeling tools:
<http://www.epa.gov/otaq/stateresources/index.htm>

Additional Resources:

The US Department of Transportation also (DOT) offers several programs to assist rural areas and small communities, such as the Transportation Toolbox for Rural Areas and Small Communities:
<http://ntl.bts.gov/ruraltransport/toolbox/>

EPA also provides information on transportation “conformity,” required by the Clean Air Act to ensure that federal funding and approval are given to highway and transit projects that are consistent with the goals established by the state air quality implementation plan:
<http://www.epa.gov/OMS/stateresources/transconf/generalinfo.htm>

The US DOT has developed “Transportation Vision for 2030. Ensuring personal freedom and economic vitality for a Nation on the move,” which defines ambitious goals. This document provides specific strategies for passenger transportation, freight transportation, financing and partnerships, and technology and innovation:
<http://www.webs1.uidaho.edu/ce501-400/resources/Addressing%20sustainability%20in%20transportation%20systems.pdf>



Transportation Case Study: Westchester County, New York Action Plan is on a Roll

In their recent sustainability plan, Westchester County included an assessment of local transportation infrastructure and approaches to reduce greenhouse gases (GHG) from this sector. The benefit: more efficient fleets lower municipal costs and less traffic cuts down on air pollution. To achieve these goals, the plan sets out a series of transportation strategies:

1. Create partnerships with neighboring communities and local businesses to reduce transportation demand. Specific approaches include:

- Use carpools and van-pools to share rides
- Participate in ride sharing programs such as Nu ride
- Encourage car sharing via services such as Zipcar.
- Set up a private transportation network such as Goloco
- Take advantage of flexible workweeks, and encourage telecommuting
- Consolidate transportation across school districts by establishing a county-wide network of school district coordinators for clean transportation

2. Encourage the use of public transit. Westchester is fortunate to have an extensive network of public transit and bus service to school is available in many communities.

3. Encourage the use of alternate modes of transportation such as biking or walking.

4. Replace vehicles and better manage municipal fleets. The plan encourages the purchase hybrid vehicles, flex-fueled vehicles, and alternative fueled vehicles. Some effective fleet management practices include:

- Conduct a comprehensive survey to determine fleet needs
- Develop a green vehicle replacement and retrofitting strategy
- Match vehicle size to the required tasks
- Retrofit buses with devices that prevent idling and unnecessary burning of fossil fuels
- Retrofit older buses with tailpipe and crankcase filters to reduce air pollution

The plan also includes other strategies to reduce GHG emissions such as encouraging businesses and households to purchase carbon offsets and substituting virtual technology, such as video conferencing, for travel.

Further information is available online:
http://www.westchestergov.com/pdfs/ENVFACIL_globalWarmingAction2008FINAL.pdf





(3b) Land Use Planning

Land use planning is a critical element in developing vibrant and livable communities, increasing property values, ensuring economic vitality, addressing potential human health issues, promoting transportation efficiency, ensuring affordable housing, and improving environmental sustainability.

Zoning is the main tool in land use planning and can be used to direct development and redevelopment in urban areas to ensure that municipalities grow in a sustainable manner. Taking advantage of innovative land use planning policies and smart growth techniques is key when striving to create a comprehensive municipal sustainability plan.

Compact, efficient urban development improves the health and quality-of-life of area residents, revitalizes the local economy, and increases environmental sustainability. Development of compact areas, even if it's a small downtown area, can reduce travel times, help preserve open space and reduce the commercial pressure to sprawl. Neighborhoods with walkable areas stimulate a strong sense of place and enhance an area's overall livability while encouraging the development of strong, vibrant communities.

Best Practices and Solutions

At the municipal level, most land use planning decisions are handled by the city planning department, planning commission, city council, or mayor's office. Larger municipalities may find it beneficial to create a new office for sustainability to work in cooperation with existing planning bureaus to achieve sustainable development and land use approaches. Smaller munici-

palities may not have this option. In such cases, it may be beneficial to recruit local residents, community leaders, business owners, and environmental groups to advise local government on land use decisions and development goals.

Smart growth principles can be applied to a range of critical planning issues including community quality of life, urban design, economic development, environmental issues, human health, affordable and accessible housing, and transportation. Smart growth principles usually encompass the following strategies:

- Creating a range of housing choices and price-points based around compact, walkable neighborhoods
- Allowing mixed land use in the form of combined retail and residential development
- Encouraging community and stakeholder collaboration in development decisions
- Fostering distinctive, attractive communities with a strong sense of place
- Making development decisions predictable, fair and cost effective
- Preserving open space, farmland, natural beauty and critical environmental areas

- Providing a variety of transportation choices
- Directing development towards existing communities and transportation corridors
- Taking advantage of compact building design
- Remediating and redeveloping brownfields appropriately
- Providing formal parks and plazas in proximity to residential land uses

Large cities such as Denver, Seattle, and Portland offer excellent insight into sustainable land use planning practices. While smart growth principles offer an excellent theoretical framework for taking steps towards sustainable growth, these city planning departments offer examples of how such principles can be used on the ground.

Measuring Success

Some specific indicators for land use planning are:

- Population density and distribution
- Percent of green space per neighborhood
- Vehicle miles traveled per capita and average commute times
- Frequency of walk or bike trips per capita
- Citizen surveys of neighborhood safety and livability
- Energy use per capita
- Number of energy efficient buildings in the municipality

Recommended Resource:

EPA's Smart Growth page contains more information on applicable techniques:
<http://www.epa.gov/smartgrowth/>

Additional Resources:

For a full description of Smart Growth principles, please visit:
<http://www.smartgrowth.org/>

The City of Portland's Sustainable Development Commission has created a comprehensive guide for identifying indicators and measuring progress to determine the success of sustainable planning and development strategies. The indicator matrix can be found on the City of Portland's website:
<http://www.portlandonline.com/shared/cfm/image.cfm?id=133058>

Seattle Department of Planning and Development:
<http://www.seattle.gov/dpd/>

Green Print Denver:
<http://www.greenprintdenver.org/>

City of Portland Bureau of Planning:
<http://www.portlandonline.com/planning/>



Land Use Planning Case Study: Portland, Oregon Land Use Planning Evolves

Recognized among American cities as one of the most dedicated to planning, Portland is frequently cited in the urban planning literature for its progressive transportation and land use policies, downtown redevelopment, and success in containing urban sprawl. Building on this success, Portland's Bureau of Planning recently initiated a comprehensive plan to guide growth and development within the city over the next 30 years. The "Portland Plan" identifies a number of goals and outlines regional development policies in order to assure that Portland's walkability, transit accessibility, and open space preservation remain intact while allowing for population growth and economic development.

The goals of the plan include:

- Create a rich and enjoyable environment for pedestrians through-out the Central City
- Strive for excellence in the design of new buildings
- Encourage construction to enhance Portland's human scale of buildings, streets, and open spaces
- Promote districts with distinct character and a diverse and rich mixture of uses (in nonindustrial areas)
- Identify and protect significant public views
- Locate the highest densities downtown and along potential and existing transit corridors

Through careful planning and a holistic approach to making land use decisions, Portland's Bureau of Planning has allowed for substantial increases in new jobs, housing units, and commercial spaces, without increasing the number of acres occupied by the central city.

Further information is available online:
<http://www.portlandonline.com/planning>



"Land-use planning should protect ecosystems and open space as these areas often provide critical natural services."



(3c) Biological Conservation and Open Space Preservation

As our nation's population continues to grow and as development of open space continues, preserving special natural places and prime agricultural land becomes ever more important.

Comprehensive land use planning should protect ecosystems and open space as these areas often provide critical natural services, such as flood buffering and water purification. Preserving open space is a frequently used strategy in comprehensive municipal sustainability planning. It is regarded as a low hanging fruit in municipal sustainability planning because of the attractiveness of open spaces and their value to local residents both socially and economically.

Open space preservation can provide aesthetic appeal and recreation opportunities, while enhancing local real estate value and making communities more livable. Burlington, Vermont, Westchester County, Saratoga County, Florida, Brownsville, Texas, and Davis, California all provide excellent examples of this.

For example, Lake Champlain Bikeways (a public-private partnership) is a bike-way system that Burlington is constantly attempting to enhance through connection to various practical as well as historic sites around the city, appealing to both residents and visitors alike.

Best Practices and Solutions

Techniques to safeguard environmentally sensitive areas vary across communities and types of surrounding ecosystems. EPA identifies three of the most common techniques:

- Protecting wetlands
- Establishing buffers along riparian zones
- Creating greenbelts and conservation easements

As our nation's population continues to grow and as development of open space continues, preserving special natural places and prime agricultural land becomes ever more important.

Plan Smart New Jersey identifies three key open space protection tactics:

1. Conservation Easements are restrictions requiring a property to be maintained forever in an underdeveloped or natural state.
2. Developer set-asides, which are voluntary protections created when projects are planned. The Plan Smart guide suggests that for maximum effect, "the jurisdiction should encourage developers to set aside land in stream corridors, mature forests, and other key environmental areas identified during the planning process, or it should use the in-lieu contributions to purchase this land."
3. Outright purchase, which, "provided the jurisdiction is committed to maintaining the land in a natural state, is the best way to ensure that land remains preserved."

Measuring Success

Some specific indicators for biological conservation and open space preservation are:

- Acres of land in easement
- Acres of protected wetland area
- Number of bike paths in proximity to popular sites

Recommended Resource:

To measure and assess the status of ecosystem health it is important to have good indicators. EPA discusses this topic in its report, Community Based Environmental Protection:

<http://www.epa.gov/care/library/howto.pdf>

Additional Resources:

PlanSmart NJ's full guide can be found online at:

<http://www.plansmartnj.org/projects/gig/index.html>

The Defenders of Wildlife Incentives for Conservation has extensive information on available approaches at:

<http://www.biodiversitypartners.org/incentives/index.shtml>



Open Space Preservation Case Study: Burlington, Vermont Engages Community to Protect Wildlife

As the area around Burlington grows, wildlife and humans have been coming into greater contact. As part of the City's open space preservation efforts, volunteers are gathering data on where animals live and the routes they use to travel in order to make informed decisions about ecosystem protection, land use planning, and development.

The volunteers are trained by a local non-profit organization, Keeping Track, that is focused on encouraging community participation in the long-term stewardship of wildlife habitat. This mission is achieved through monitoring, cooperation, data management, conservation planning and education.

Volunteers must complete six full-day training workshops in the field plus two classroom sessions. Participants are taught a scientifically based data collection methodology and then help with field work, monitoring and other facets of the program. The program has trained nearly 1,300 volunteers representing almost 100 communities and has gathered valuable data to help shape local land use preservation efforts.

Further information is available online:
<http://www.keepingtrack.org/>



“Air pollution impacts were estimated to cost the United States between \$24 billion and \$451 billion dollars.”



(3d) Energy, Air Quality and Climate Change

Communities need reliable sources of affordable energy. With prices for gas and oil rising and concerns about the impacts of fossil-fuel power generation growing, sustainable energy solutions have never been more important, especially at the municipal level.

In 1991, air pollution impacts were estimated to cost the United States between \$24 billion and \$451 billion dollars (in 1991 dollars) (NREB 2007).

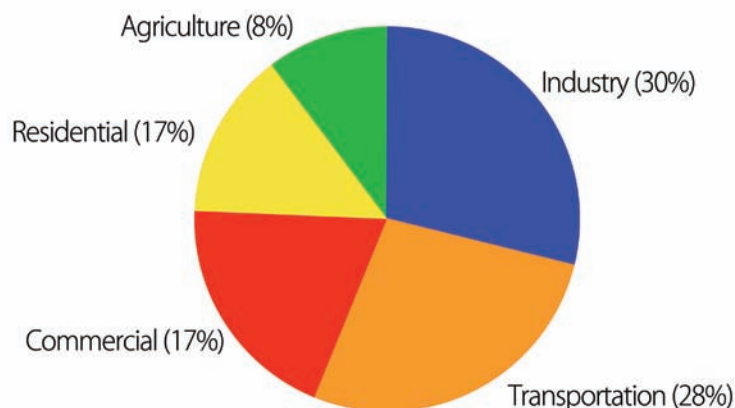
Solutions such as improving energy efficiency and adding renewable energy sources can help communities reduce air pollution while reducing the output of greenhouse gases. In turn, reduced air pollution can improve public health and lower energy costs. By integrating energy efficiency strategies into your community planning process, the cost of upgrades can be kept to a minimum. Clean energy providers, biofuel production and the retrofitting and upgrading of existing infrastructure often create new opportunities for economic development.

The way energy is generated to meet local needs is also very important for climate change. The U.S. has long been responsible for more GHG emissions than any other country, in absolute and per capita values.

Of the total greenhouse gases produced in the US, burning fossil fuels contributes over 80 percent of greenhouse gases (EIA 1999; Drazga 2007). By getting energy from cleaner renewable sources, a large difference can be made in the fight against global warming. This then dovetails into transportation efficiency improvements, as discussed above in its own section, to make an even bigger difference.

Greenhouse Gas Emissions by Sector, 2006

total emissions = 7.074 MMT CO₂e



Source: US EIA DOE 2006

Energy generation and climate change are also often connected to local air quality. The generation of energy through fossil fuels, both for power and for transportation, also results in air pollution. This link allows for even greater positive impact through energy efficiency measures and switching to cleaner fuel sources. Fossil fuel energy generation causes both chemical and particulate air pollution, also better known as smog. Ozone and acid rain can be problems, too, depending on local conditions.

Best Practices and Solutions

1. Saving Energy

Energy efficiency is often the first place localities start when trying to make more effective use of resources. Although efficiency upgrades can require significant investment, by increasing the level of efficiency these upgrades can often pay for themselves within several years as shown in the Portland case study.

Strategies to promote energy efficiency include:

- Conducting an energy audit of city buildings. An energy audit will identify the most cost-effective projects. Utilities and energy service providers often offer them. Even where a full audit is not feasible, you can save money and energy through better tracking and management of energy use.
- Encourage and support private audits in both businesses and residences through the provision of information, technical support, or even economic incentives
- Start a weatherization program in local neighborhoods with old housing stock
- Promote the Energy Star “Change-A-Light” program at local businesses. By replacing older lamps systems with higher





efficiency lighting, communities can reap significant gains in both energy use and, in many cases, operation and maintenance spending as well.

- Promote and support energy efficiency upgrades in local industry. Improving the efficiency of appliances, HVAC systems and industrial process equipment.

<http://www.getenergysmart.org/CommunityOutreach/EnergySmartCommunities.aspx>

2. Clean Energy

Local governments can arrange with utilities for the provision of renewable source energy, or for the provision of consumer options programs. Three great examples of this are listed below:

<http://www.oaklandnet.com/Mayor-SPress/RenewableEnergy.pdf>

<http://www.njcleanenergy.com/residential/programs/cleanpower-choice/new-jersey-cleanpower-choice-program>

<http://www.portlandonline.com/auditor/index.cfm?a=146102&c=28608>

Local regions can also start securing their energy futures through something called “distributed generation.” This can mean using a diversity of smaller scale local, and perhaps even renewable energy generation sources to produce power. Sources can include cogeneration from local industry and agriculture (see the Fresno, CA case study), or renewables such as solar, wind, and even new tidal or wave technology. Such a strategy can potentially boost local economies through new development and locally earned profits. More importantly, though, it gives local communities energy independence and security in an uncertain market. Simply put, it keeps money and control in local communities, and brings increased prosperity to the community. For more information, visit: <http://www.energy.ca.gov/distgen/>. Local strategies to promote clean energy:

- Micro-generation
- On-site solar
- Combined Heat and Power
- Geothermal
- Wind
- Landfill methane capture

Tip: To find out how energy is produced in your community, type in your zip code at <http://epa.gov/greenpower/buygp/powerprofiler.htm>

Measuring Success

Measurements of success for energy can include:

- Amount of pollutant emissions reduced (e.g. CO₂, SO_x, NO_x)
- Units of energy consumption reduced (e.g. Btu’s)
- Dollars saved on energy costs
- Amount of local energy supply that’s renewable (e.g. percent)

Recommended Resource:

ENERGY STAR is a joint USEPA, USDOE program helping businesses and individuals protect the environment through superior energy efficiency. Not just for appliances, ENERGY STAR is also for buildings, utilities, and more.

<http://www.energystar.gov/>

Additional Resources:

Alliance to Save Energy (ASE) is a non-profit coalition of business, government, environmental and consumer leaders. The ASE supports energy efficiency as a cost-effective energy resource under existing market conditions and advocates energy-efficiency policies that minimize costs to society and individual consumers, and that lessen greenhouse gas emissions and their impact on the global climate:
<http://www.ase.org/>

The American Council For An Energy Efficient Economy (ACEE) is a nonprofit organization dedicated to advancing energy efficiency as a means of promoting both economic prosperity and environmental protection:
<http://acee.org/>

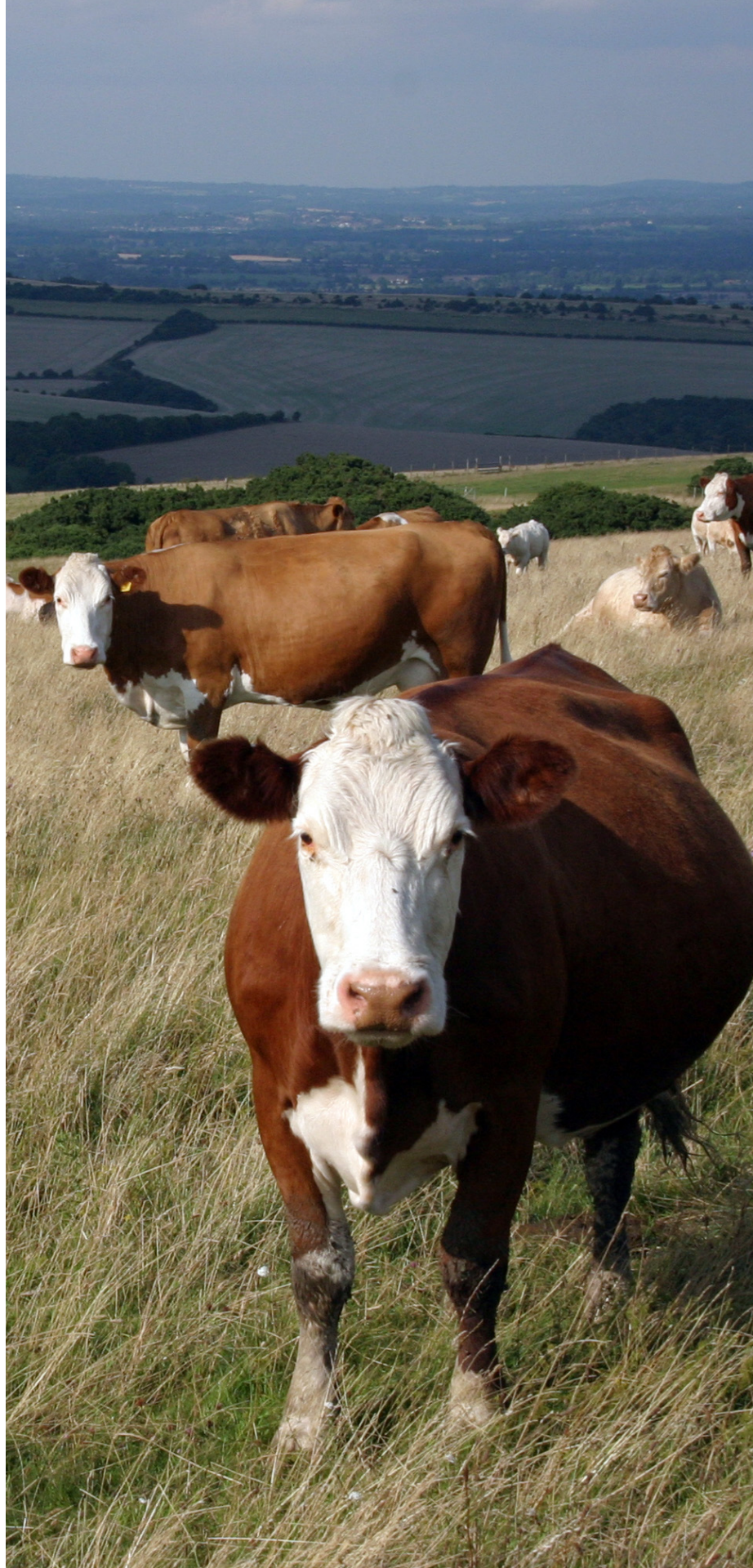
Consortium for Energy Efficiency (CEE), a nonprofit public benefits corporation, develops national initiatives to promote the manufacture and purchase of energy-efficient products and services:
<http://www.cee1.org/>

This online calculator can help analyze potential energy and economic savings by switching to more efficient appliances, lighting, and other forms of efficiency:
<http://www.pge.com/myhome/saveenergymoney/resources/appliancecalculator/>

EPA Green Power Partnership
<http://epa.gov/greenpower/index.htm>

Additional energy efficiency case studies from the US Council of Mayors:
http://usmayors.org/uscm/news/press_releases/documents/bestenergy2001.pdf

Additional energy cost-saving ideas for your city:
http://www.nyc.gov/html/nycwasteless/html/at_agencies/govt_case_studies_energy.shtml





Energy Case Study No. 1: Portland, Oregon Energy Challenge Saves City Millions

In 1991, Portland, Oregon established the “City Energy Efficiency Challenge.” This bold initiative started with energy audits at eight City bureaus, who contributed 1 percent of their energy bills to help fund the efforts. The City then obtained a small low interest loan of \$777,000 to help fund energy efficiency measures.

The \$2.6 million they spent in the first 3 years on energy efficiency improvements generated average internal rate returns of 25.7 percent, with a pay-off time of 3.8 years. By the late 1990s, the energy savings reached \$1 million per year, with total savings of \$9.46 million between 1991 and 2001. Current annual energy savings are \$2 million per year, or 15 percent of the City’s energy bills.

In addition to dramatic energy efficiency improvements and considerable savings to local taxpayers, Portland has also greened its energy sources. In 1995, they made a deal with Pacific Gas and Electric to receive 5 percent of their electricity from renewable sources. Portland is now sourcing 10 percent of their electricity from renewable sources (as of 2007), and is currently negotiating with a private firm to increase its use of renewable power by 2010.

Further information is available online:

<http://www.portlandonline.com/osd/index.cfm?a=bbbhde&c=ecdjj>

http://www.smartcommunities.ncat.org/success/city_energy.shtml



Energy Case Study No. 2: Fresno, California “Cow Power” Powers up the Grid

Pacific Gas and Electric Company (PG&E), has teamed with BioEnergy Solutions on a biogas-to-pipeline injection project. It produces renewable gas from animal waste, and is the first project in California to deliver pipeline-quality, renewable natural gas to a utility. It delivers up to 3 billion cubic feet of renewable natural gas a year to PG&E.

This system reduces methane emissions by 70 percent at Vintage Dairy, a 5,000-cow dairy in the town of Riverdale. Since methane is a GHG 21 times more potent than CO₂, this approach could be an effective climate change fighter.

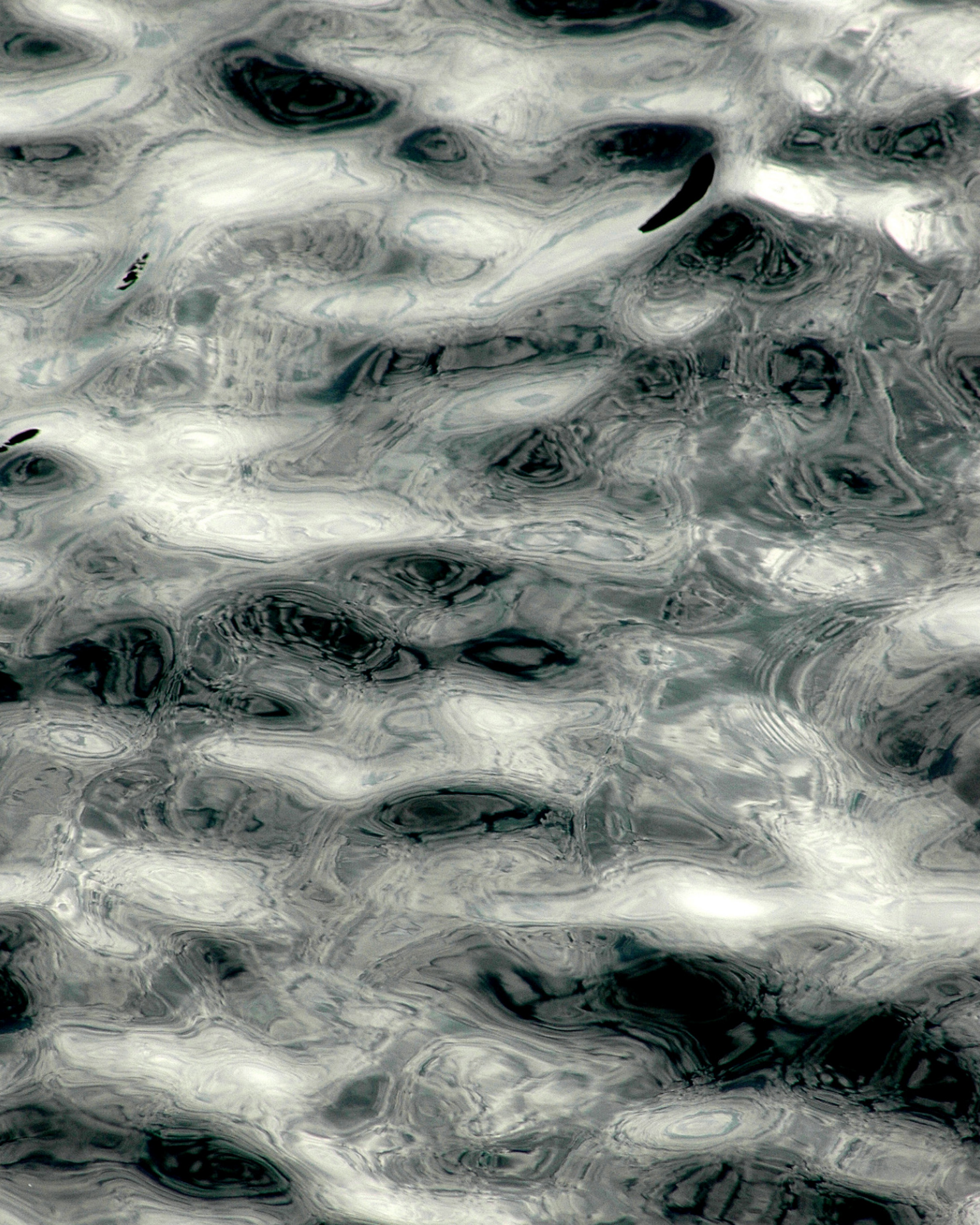
Manure from the cows and calves is flushed into an almost 300,000 square-foot covered lagoon, which traps the methane gas released during manure decomposition. The methane is scrubbed to meet PG&E’s standards for power plants and then delivered to the utility through the pipeline. PG&E uses the methane to create electricity for its central and northern California customers.

BioEnergy Solutions, founded by David Albers, a third-generation dairyman and owner of Vintage Dairy, pays for and installs the needed infrastructure needed to process the manure and pump the methane into the PG&E pipeline. Proceeds from gas sales and emissions credits are used to help reduce the greenhouse gas emissions of other dairy owners.

Further information is available online:

BioEnergy Solutions: www.allbioenergy.com

Pacific Gas and Electric: www.pge.com



(3e) Protecting Water Quality and Ensuring Future Supply

Community prosperity relies on continuous access to clean water – from reliable drinking water resources to clean beaches and viable commercial and sport fishing industries. Water is becoming ever more scarce around the world, as populations increase, and our aquifers are drained faster than nature can refill them.

Many local governments, particularly in the West and Southwest, such as Salt Lake City and Las Vegas, have been aware of this for some time now. Others, like Atlanta, Georgia are just beginning to come to terms with the harsh reality that water is a precious and scarce resource, which must be used wisely and conserved whenever possible.

Physical scarcity of water is not the only concern. Local fisheries are very sensitive to watershed health, too. Protection of local watersheds helps to ensure the long-term health and profitability of recreational and commercial industries for all communities. An extreme example is the “dead zone” in the Gulf of Mexico, where pollution of the Mississippi watershed has hurt local fisheries and water quality.

Often, municipal water management strategies are shared across regional borders due to watershed overlap of multiple jurisdictions and water treatment facilities that serve multiple municipalities. Municipalities are also influenced by a myriad of federal, regional, and local standards for water treatment, quality, and conservation. The most common approach is to address water sustainability through a distinct strategy; however, many communities also address water resource concerns through land use planning and other smart growth policies with an aim to conserve valuable water resources.

What is common to all localities is the ongoing potential for improvements in local water use efficiency and water resource protection. Water resources can be protected and conserved through a variety of strategies involving: efficient use of municipal supplies and recycling; on-site collection, recycling, and treatment; wastewater treatment system improvements; and the reduction of nonpoint source pollution of local watersheds and aquifers.

Best Practices and Solutions

1. Promote Water Conservation

Using water efficiently is key in promoting water conservation. It also saves a lot of money. For instance, according to EPA the average household spends as much as \$500 per year on its water and sewer bill. Conserving water also reduces energy use, which in itself is a big savings, as discussed above in a separate section on energy.

To address this issue EPA sponsors a program called WaterSense that “seeks to protect the future of our nation’s water supply by promoting water efficiency and enhancing the market for water-efficient products, programs, and practices”. The

website has a range of resources and fact sheets:
<http://www.epa.gov/watersense/index.htm>

Landscape planning is a creative way to conserve water especially in places that face natural environmental restrictions. With the knowledge of proper plants and other best management practices, the Southern Nevada Water Authority program on Landscapes has been quite effective:
http://www.snwa.com/html/land_index.html

Because many levels of governance are involved in regulating water quality, finding the right resources can be time consuming. The U.S. Department of Energy, within its Department of Energy Efficiency and Renewable Energy, has a program that specifically addresses Water Efficiency:
http://www1.eere.energy.gov/femp/water/water_resources.html

Green building practices can also contribute to water conservation and wastewater reduction. Some green buildings and facilities use water catchment systems and gray water recycling and treatment to capture rainwater and reuse wastewater. Others simply incorporate water efficient technology such as aerators, low-volume toilets, low-flow showerheads, and water-efficient landscaping and/or irrigation systems.

GreenerBuildings.com estimates that many commercial buildings could reduce water usage by 30 percent or more through efficiency measures. More information and practical examples:
http://www.greenerbuildings.com/backgrounders_detail.cfm?UseKeyword=Water%20Use

2. Protecting the Local Watershed—Point Source Pollution

Point source water pollution is pollution that can be traced back to a specific discharge source, like a factory or wastewater treatment plant.

Wastewater

Communities that already have centralized wastewater collection and treatment systems are already familiar with the National Pollution Discharge Elimination System (NPDES), the federal regulatory program that sets limits to pollution:
<http://cfpub.epa.gov/npdes/>

For areas without existing public sewage systems, switching to centralized ones may or may not be realistic, or even the preferred option. This depends very much on local characteristics such as population density, climate, topography, geology, and how close drinking water sources are to housing. If you are from a smaller community, check out the following:
<http://www.epa.gov/owm/mab/sm-comm/index.htm>
<http://cfpub.epa.gov/owm/septic/index.cfm>

Storm Water

When most people think of EPA and the NPDES, they don't think about stormwater. However, stormwater can be considered a point source pollutant under many circumstances, and is regulated under the NPDES:
http://cfpub1.epa.gov/npdes/home.cfm?program_id=6

Using green design principles can naturally filter storm run-off, diverting it from wastewater systems and storm drains. This reduces local wastewater treatment demands, lowering costs and energy usage, and protects natural water bodies from pollution:
<http://www.epa.gov/owow/nps/lid/costs07/documents/reducingstormwatercosts.pdf>
http://cfpub.epa.gov/npdes/home.cfm?program_id=298

3. Protecting the Local Watershed — Nonpoint Source Pollution

Nonpoint source pollution is water pollution from urban run-off and unregulated non-industrial or agricultural sources. It is usually local watersheds and coastal habitats that are affected by this, though local drinking water sources can also be impacted as well. This is a persistent problem facing most localities, and a major threat to long-term water security and environmental health. To address nonpoint source pollution in local watersheds, there are various strategies that can be employed, including the following:

Collecting and treating runoff prior to its entry into local streams, rivers, or the ocean:

http://sfwater.org/detail.cfm/MC_ID/14/MSC_ID/361/C_ID/1425

Preserving and constructing local wetlands as buffers for aquatic natural systems

<http://www.cwp.org/wetlands/naco.htm#one>
<http://www.epa.gov/OWOW/wetlands/restore/>

Encouraging strategies for on-site runoff retention and/or treatment, or for the provision of pervious surfaces:

<http://egov.cityofchicago.org>
<http://clerk.ci.seattle.wa.us>

Partnerships with local industry for effluent reductions through green industrial practices and water conservation measures:

<http://www.ci.boulder.co.us/www/pace/manufacturing/index.html>

Community outreach and educational programs about nonpoint pollution in general, or also specifically about septic systems where they are being used:

<http://www.epa.gov/owow/nps/toolbox/>
<http://www.co.thurston.wa.us/health/ehhm/outreach.html>

Partnerships with local non-profits, schools, and other community groups for

watershed monitoring to identify problem areas:

<http://www.epa.gov/volunteer/>

<http://www.usawaterquality.org/volunteer/links.html>

<http://www.watershedstewardsproject.com/>

Measuring Success

Water efficiency strategies can be monitored through:

- Direct measurement of reductions in water consumption
- Benchmarking with localities having similar characteristics (e.g. population, climate, topography)
- User participation in both private sector partnerships and residential water efficiency programs
- The number of certified green building or development projects

Watershed health can be monitored through:

- Local compliance rates with federal and regional water quality laws
- Testing for chemical and physical water quality indicators (e.g. pH, temperature, nutrient levels, water clarity, the presence of toxins and harmful bacteria)
- The level of treatment required to produce safe drinking water
- Monitoring population levels and health of local plants and animals (water and land)
- Measuring of surface flows and aquifer refilling rates
- The relative amount of each local stream or river that is “daylit,” or not diverted through underground pipes beneath buildings and roads, and has a natural buffer around it

- The ratio of water-permeable surfaces and green spaces to paved surfaces or spaces occupied by buildings with conventional roofs

Recommended Resources:

EPA and other federal agencies provide substantial funding resources for local water infrastructure development, as well as watershed protection and conservation programs. The following links are fantastic guides to water project funding sources:

http://www.epa.gov/safewater/dwsrf/pdfs/guide_dwsrf_funding_infrastructure.pdf

http://www.epa.gov/safewater/dwsrf/pdfs/fs_dwsrf_swp-funding-matrix.pdf

Additional Resources:

A must for community water providers serving at least 15 connections or 25 people year-round:
<http://www.epa.gov/safewater/ccr/index.html>

EPA's office of Ground Water and Drinking Water (OGWDW) protects public health and ground water and has extensive information on water quality. Local drinking water information is available online at:
<http://www.epa.gov/safewater/dwinfo/index.html>

EPA also regulates the total maximum daily loads (TMDL), which is a "calculation of the maximum amount of a pollutant that a water body can receive and still meet water quality standards, and an allocation of that amount to the pollutant's sources." Reports are available per EPA region and per states and interactive map along with more information can be found at:
<http://www.epa.gov/owow/tmdl/>

Division has an informative "Successful Water Efficiency Programs for Non-Residential Water Customers" Presentation:
<http://www.georgiaplanning.com/water-toolkit/Documents/WaterConservation-DroughtManagement/SuccessfulWater-EfficiencyPrograms.ppt>

American Water Works Association and Water Environmental Federation "Benchmarking Performance Indicators for Water and Wastewater Utilities: 2007 Annual Survey Data and Analyses Report." It is only available under purchase but can be found at:
<http://www.awwa.org/bookstore/productDetail.cfm?ItemNumber=34298>

Ontario, Canada, Ministry of the Environment's Water Conservation Case Study:
<http://www.ene.gov.on.ca/programs/3659e.pdf>

US EPA Information and Resources on Nonpoint Source Pollution:
<http://www.epa.gov/owow/nps/whatis.html>

Water Environment Research Foundation report has information and case study links:
<http://www.werf.org/livablecommunities/pdf/benefits.pdf>

Water Quality Trading — Some States are pursuing water quality trading schemes to promote watershed protection and support development of sustainable infrastructure. See if your state participates and if you waste water treatment plant might be eligible:
<http://www.epa.gov/owow/watershed/trading/tradingmap.html>
http://www.conservaioninformation.org/?action=learningcenter_publications_waterqualitytrading
http://www.epa.gov/npdes/pubs/wqtradingtoolkit_multiple-ps.pdf



Water Case Study: Sedona, Arizona is "Water Wise"

The city of Sedona is located in the northern Verde Valley region of Arizona and given its very arid local climate, this desert community is dependent on a limited supply of groundwater. Water conservation is thus an urgent matter year round.

The "Sedona is Water Wise" program offers a variety of tools to promote water conservation. Recognizing that over half of the locally consumed water went to landscaping and irrigation, they began to promote simple techniques such as the use of native plants or the use of containers to catch and store rainwater to water plants. They also promote water conservation strategies for houses, industry, tourists, and public education facilities.

Sedona has also implemented an award program to recognize individuals and businesses who demonstrate water wise conservation practices. The public may nominate an individual, business, or organization. Its purpose is "to promote the importance of water conservation and to stimulate a greater interest in conserving Sedona's water by recognizing those who contribute to protecting this precious and limited resource."

Further information is available online:
<http://www.sedonaaz.gov/egov/sidePage.aspx?dID=906>





(3f) Solid Waste Generation and Recycling

According to EPA, the average person in the US generated 4.6 pounds of waste per day and recycled 1.5 pounds in 2006. The energy saved by recycling is the equivalent of more than 10 billion gallons of gasoline per year.

The two most common management strategies for municipal garbage are to either construct a landfill to dispose of waste within your community or to export your waste to another community. Another approach is the use of waste-to-energy incineration.

As the population of most local governments increases, more and more stress is put on land use, leaving limited space designated for solid waste disposal or landfill facilities.

Solid waste is a topic that most people don't tackle; however, waste generation in most areas has been increasing.

Even if municipalities choose to export their waste, they still have to deal with the added cost of transporting their waste. These costs include depreciation of vehicles, personell-hours to transport trash, fuel for the vehicles, as well as administrative costs associated with contract negotiations.

Wherever your trash goes, a comprehensive sustainability plan must tackle this issue with the goal of reducing the amount of trash that enters the waste stream. Solutions include programs to encourage

recycling and reusing materials, composting organic waste, and using waste-to-energy solutions.

Both long-term and short-term benefits can be attributed to solid waste reduction and recycling. The more we reduce our waste stream, the more land that can be used for other services and the less money that has to be spent to deal with it.

Your municipal sustainability plan should focus on the 3 R's of the waste stream – Reduce, Reuse, and Recycle.

In addition, many items sometimes placed in household trash are hazardous materials that should be disposed of properly. These items include paints and chemicals, batteries, electronics (E-waste), light bulbs, and construction debris and materials (C & D). While C & D is not accounted for in municipal solid waste, this waste stream includes building demolition and renovation materials from construction. In 1996, EPA estimated that approximately 136 tons was generated, with concrete making up the majority at 40percent to 50percent. With this in mind, many municipalities and/or facilities have instituted programs to address this waste stream.

Electronic waste, or E-waste, programs are still relatively young, and often ex-

perimental; as a result, E-waste is generally handled through special collection events rather than a continuous collection program. According to EPA, approximately 1.9 to 2.2 million tons of used or unwanted electronics were thrown away in 2005. The majority, 1.5 to 1.9 million tons, was disposed in landfills, while only 345,000 to 379,000 tons were recycled. It is clear that there is still considerable room for improvement, and e-waste strategies should be an integral component of any local sustainability planning effort.

Best Practices and Solutions

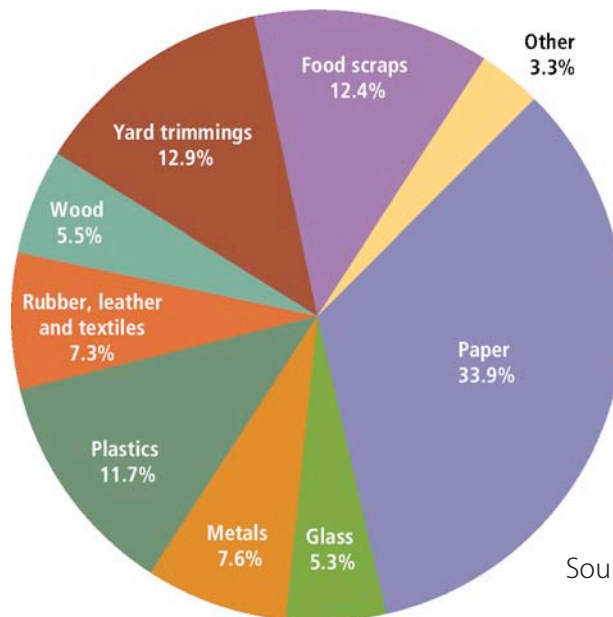
A waste audit is a crucial first step in reducing the flow of garbage. A waste audit can identify opportunities for waste diversion, prevention and reduction, and increasing recycling. Review historic data to determine how much is being thrown out, how much is being recycled (if a program exists), and any other programs that your community may have in place. It's also important to document the costs associated with disposal and reduction programs.

Once a basic inventory is complete and a baseline is defined, you can identify targets. Your initial target could be as simple as starting a recycling program (if one doesn't exist) or expanding an existing program. Using the baseline inventory, you can monitor and compare future waste generation to see if your program is a success.

Strategies for Reducing Waste:

1. Implement a 'Pay as you Throw' System which would charge residents for what they actually throw out to encourage them to throw out less to save money.
2. Use Full Cost Accounting (FCA), which identifies and assesses the costs associated with managing a solid waste facility to account for the real costs of solid waste management. It also assists with short and

Total MSW Generation, 2006 (251 Million Tons)



Source: EPA, 2007

long-term planning by local policy makers to identify opportunities to streamline and improve operations.

3. Encourage state involvement in reducing waste.
4. Implement or expand a compost program. Organize short-term seasonal events specifically for grass clippings, fallen leaves, or Christmas trees or a long-term municipal-run food waste program for residents, local restaurants/businesses, or schools and hospitals.
5. Make better purchases. Buying products that are longer lasting or recyclable, contain less packaging materials, and are less harmful to the environment is a proactive step to reducing your municipal solid waste. Refer to the green procurement section for more information.

Strategies for Reuse and Recycling:

1. Provide alternative opportunities/second life or reuse of soft used items, such as a materials and waste exchange.
2. Increase (or start) the amount of materials recycled in your community.

Strategies for Safe Disposal of Hazardous Waste:

1. Address Hazardous Waste
Both commercial and residential hazardous wastes are harmful to the environment and to human health if not disposed of in the appropriate manner. Whether it's an annual or year round program household & commercial hazardous waste should be a part of your municipal solid waste reduction program so as to ensure these materials are disposed of appropriately and do not harm the environment.

2. Address E-Waste
E-waste is an increasing component of local waste streams, and the new frontier in solid waste management. Fortunately, there are existing programs in place, and a growing body of information from those leading the charge.

According to EPA approximately 1.9 to 2.2 million tons of used or unwanted electronics was thrown away in 2005. The majority, 1.5 to 1.9 million tons, was disposed in landfills, while only 345,000 to 379,000 tons were recycled.

3. Address Construction and Demolition (C&D) disposal
C & D materials encompasses waste that results from the construction, renovation, and demolition of buildings, roads, and bridges. Keeping this material out of the waste stream can conserve landfill space. C & D waste reduction can also be addressed through green building practices. Refer to the green building section for more information.

Measuring Success

Some specific indicators for solid waste generation and recycling are:

- Reduction in waste stream reaching local landfills or being exported
- Increased percentage of recycled materials (e.g. metal, plastic, glass, paper, yard trimmings, and E-waste)
- Reduction in amount of recycled materials found during a secondary sort
- Creation of a waste stream baseline via an audit

TIP: EPA has developed a voluntary, standard methodology for measuring recycling rates. This web site helps state and local government officials learn more about the standard methodology.
<http://www.epa.gov/recycle.measure/>

Recommended Resource:

The Waste Section of EPA's Website offers information on all types of waste opportunities, educational resources, programs, etc. to dispose, reduce, reuse and recycle everything found in the waste stream.
<http://www.epa.gov/epaoswer/osw/index.htm>

Additional Resources:

EPA Waste Assessment Website offers information on assessing what is thrown away and what is recycled in your community:
www.epa.gov/epaoswer/osw/conservation/program/assess.htm

Decision Makers' Guide to Solid Waste Management aims to provide cost-effective solutions to solid waste management that protect quality of life and the environment:
<http://www.epa.gov/epaoswer/non-hw/muncpl/dmg2.htm>

EPA partnership program assists US organizations to reduce solid waste as well as improve cost savings and benefits to the environment. This website offers a variety of information about the program, including resources on reducing waste, planning and implementing your programs, and reporting your results and celebrating success:

<http://www.epa.gov/wastewise/>

Reduce

1. Pay As You Throw (PAYT):
Resources, such as publications, articles and FAQs
www.epa.gov/payt/intro.htm

A collection of resources to inform local officials about implementing a PAYT program

www.epa.gov/epaoswer/non-hw/payt/tools/toolkit.htm

2. Full Cost Accounting (FCA):
Basic information, resources, contact information and frequently asked questions
www.epa.gov/epaoswer/non-hw/muncpl/fullcost/index.htm

Full Cost Accounting: Practical Guide on Converting to FCA, March 2000. Government Finance Officers Association (GFOA)
www.epa.gov/epaoswer/non-hw/muncpl/fullcost/natdocs.htm#howtoconvert

The Florida State Department of Environmental protection has a website devoted to FCA with access to software and a report entitled The FUNdamentals of FCA.
<http://www.dep.state.fl.us/waste/categories/fca/default.htm>

3. Composting Information — EPA
This website offers basic information on composting as well as resources on local legislation, environmental benefits, publications and links.
<http://www.epa.gov/compost/>

4. Source Reduction and Reuse — EPA
This website offers an overview of source reduction and reuse with basic information, benefits and facts, and related links for more information.
<http://www.epa.gov/epaoswer/non-hw/muncpl/sourcred.htm>

5. Buying Wisely (choosing products with less packaging)

Buy Recycled Comprehensive Procurement Guidelines (CPG) — EPA

This site provides the latest information on EPA guidelines for procuring recycled-content products. It contains the latest CPG developments, upcoming events, and information on designated products.
<http://www.epa.gov/epaoswer/non-hw/procure/index.htm>

Maryland State Source Reduction Program. The state of Maryland has an annual goal for reducing waste of 40percent and a credit system that became effective in 2000 to assist participating counties and the City of Baltimore. The website offers information on the states initiative with information on how to divert waste through source reduction.

http://www.mde.state.md.us/Programs/LandPrograms/Recycling/source_reduction/index.asp

Re-use

1. Source Reduction and Reuse — EPA
This website gives basic facts and benefits of source reduction and reuse as well as resources including organizations, programs and publications.
<http://www.epa.gov/epaoswer/non-hw/muncpl/sourcred.htm>

In addition the Reducelt Companion Software along with the Source Reduction Program Potential Manual can be found at:

<http://www.epa.gov/epaoswer/non-hw/reduce/reduceit/>

2. Materials & Waste Exchanges — EPA
These programs exist all over the globe and serve as opportunities to match up buyers and sellers by creating a market for recyclable and reusable commodities. This website provides links to international, national and state specific exchanges.
<http://www.epa.gov/jtr/comm/exchange.htm>

3. San Francisco ecofinderrrr Website
This government website allows residents to look up what can be recycled, reused or disposed of, how to do it, and where to bring it. It's a great resource to help identify opportunities that may exist in your community.
<http://sfgov.org/site/frame.asp?u=http://www.sfenvironment.org>

Recycle

1. Recycle on the Go — EPA
This EPA initiative encourages recycling in public places but is a good source for setting up a new program.
www.epa.gov/epaoswer/osw/conserve/onthego/index.htm

2. Earth 911 & 1-800-CLEANUP
The mission of Earth 911 is "to deliver actionable local information on recycling and product stewardship that empowers consumers to act locally, live responsibly and contribute to sustainability." The website & phone number offer information and resources on recycling and reuse locations across the nation.
<http://earth911.org/>

3. RecycleBank.org
This organization is a cost effective and environmental conscious solution for communities to give incentives for encouraging recycling to minimize the rising costs of waste disposal. In addition it manages and provides reports to track the success of the program.
<http://www.recyclebank.com/>

4. San Francisco's Zero Waste Program
This website defines San Francisco's aggressive goal of reaching zero waste by 2020 with information on the programs available in the city and how they plan to reach that goal through reducing, reusing and recycling.
<http://sfgov.org/site/frame.asp?u=http://www.sfenvironment.org>

Hazardous Waste

1. Hazardous Waste Recycling — EPA
"To promote the protection of health and the environment and to conserve valuable material and energy resources." EPA developed this program to encourage the reuse and reclamation of these materials.
<http://www.epa.gov/epaoswer/haz-waste/recycle/hazrecyc.htm>

2. Household Hazardous Waste — EPA
Improper disposal of paints, pesticides, cleaners, oils, etc. can lead to contaminated groundwater and can pollute the environment. These contaminants should be disposed of properly. This website offers informational facts and resources on the topic.
<http://www.epa.gov/epaoswer/non-hw/muncpl/hhw.htm>

3. E-Cycling — EPA
This website offers basic information and resources on how to address and handle this growing waste stream.
<http://www.epa.gov/epaoswer/haz-waste/recycle/ecycling/index.htm>

4. Reconnect
This organization is a partnership between Goodwill Industries and Dell Computers that partners with local communities to create a recovery program for electronics in an effort to reuse and recycle this potential waste stream in an environmentally responsible way.
<http://www.reconnectpartnership.com/>



Solid Waste Case Study: San Francisco Moves Towards Zero Waste

In 2003, San Francisco adopted aggressive waste reduction goals. By 2010, the city aims to divert 75 percent of waste headed to the landfill; by 2020 the goal is to divert 100 percent of the waste stream. According to the Department of Environment's Strategic Plan, they are currently two thirds (69 percent) of the way to reaching their zero waste goal. The city has made rapid progress by implementing a 3-cart system for waste collection, providing grants, forging partnerships and promoting a host of other recycling and waste reduction initiatives.

The 3-Cart System is a convenient, user-friendly system that encourages recycling of waste by making the process as easy as possible. Containers are color coded to help sort waste into the appropriate cart: bottles, cans, and paper in the blue cart, compostable items (food scraps and yard waste) in the green cart and all non-recyclable, non-compostable garbage in the black cart.

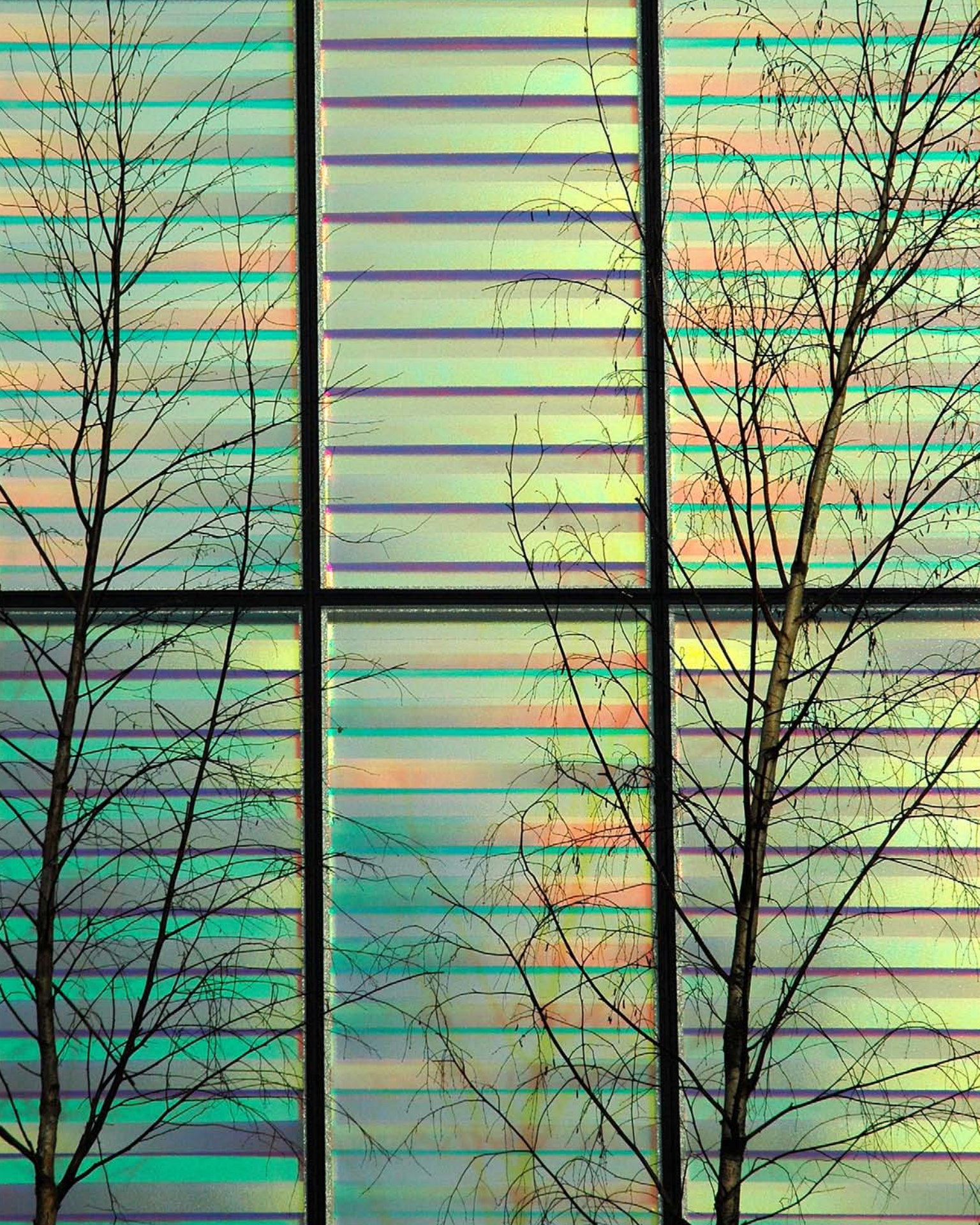
The ecofinderRRR website-based program has a quick and advanced search function to find out how to dispose of almost anything. The extensive database of options can be sorted by material, location, services (e.g. pick up, drop off, etc.), end use (e.g. recycle, repair, reuse, etc.), and by associated costs (e.g. buy back, free, payment, etc.).

Collaboration between SF Environment, the Commission on the Environment, the Board of Supervisors, and the Mayor has been extremely successful at creating policy by passing resolutions and ordinances that help reach the zero waste goal. The intent is to have the government lead by example while encouraging the general public and private sector to follow along. Recent resolutions are encouraging innovative approaches such as "precautionary" purchasing to minimize waste, a demolition debris recovery plan and a new program to recycle computers and electronics.

SF Environment also offers a variety of grant programs that disperse approximately \$600,000 a year to initiatives that increase the diversion of waste in a cost-effective way. Funds are available to nonprofit organizations for projects ranging from reuse and recycling to market development and education.

The work of SF Environment's Zero Waste team involves a broad spectrum of partners to carry out, promote and develop effective programs. Partners range from local haulers to city agencies as well as hundreds of other for-profit and nonprofit organizations.





(3g) Green Building

Environmentally sound building is central to local sustainability. Each building material has its own history of energy and water use, raw material extraction, and possibly even environmental pollution. The selection of environmentally sound raw and recycled materials can substantially reduce both on-site and off-site environmental impacts of construction.

The U.S. Green Building Council estimates that the construction of buildings currently accounts for 30 percent of all raw materials used in the U.S. (2008).

In a 1996 study, it was found that disposal of used building materials comprises 60 percent of non-industrial U.S. waste (EPA 2004).

However, it was also found that 20 percent to 30 percent of building debris was then already being recovered for recycling (EPA 2004). Though green building projects planned or underway for 2008 exceed \$12 billion in value, this is only a fraction of the \$60 billion in green construction projected for 2010 (Yudelson Associates 2008).

This recent boom in green building has brought with it a wealth of new resources. Green building products, services, and in-

formation are more accessible than ever before. And green building has become cheaper too. Recent studies have shown that the cost gap between green and conventional building is closing, and that long term cost savings far outweigh any additional upfront costs — relative cost is actually related to project design and management, and not necessarily because of green building practice (Davis Langdon 2004; Davis Langdon 2007; Kats et al. 2003).

At the cutting edge are governments who have begun to lead by example, reaping the fruits of green building and creating incentives for others to join them. The US Green Building Council lists government initiatives as the primary factor driving recent green building sector growth, and anticipates a 62 percent growth in public sector green building projects. Larger cities such as Boston, Chicago, Dallas, New York, Portland (OR), San Francisco, San Jose (CA), Seattle, and Washington, DC have already created mandatory green building requirements, as have smaller cities such as Chula Vista (CA), Greensburg (KS), Pleasanton (CA), Scottsdale (AZ), and West Hollywood (CA). And these are just a few.

Best Practices and Solutions

EPA and the USGBC have developed extensive guidance and resources for green building and locating green building materials, very accessible through websites and publications. EPA has outlined major elements of green building which include:

- Energy Efficiency and Renewable Energy
- Water Stewardship
- Environmentally Preferable Building Materials and Specifications
- Waste Reduction
- Toxics
- Indoor Environment
- Smart Growth and Sustainable Development

The U.S. Green Building Council's (USGBC) Leadership in Energy and Environmental Design (LEED®) Green Building Rating System™ has become the commonly used standard for green building. They have also developed a framework for selecting green building materials. The following highlights (USGBC New Construction Reference Guide 2007) serve as universal green construction material selection criteria:

- Re-use of existing on-site buildings and components
- Re-use of existing off-site building resources
- Use of recycled materials or those with recycled content
- Use of regional materials
- Use of "rapidly renewable materials" (USGBC 2007)
- Use of certified sustainable forest products

- Use of energy and water efficient hardware and technology
- Use of non-toxic substances

Green building is about maximizing the use of local and regional resources to minimize transportation energy and monetary costs. It's about re-using the things that still have a lot of good use left in them, and if new things are required, selecting those produced with the least negative impact on the natural environment and our health. Materials are also selected that are suitable for the local environmental conditions such as climate, corrosion, and natural hazards. It's about a slightly adjusted orientation at the start, designing based on the optimum materials and the given location, rather than conforming the location and materials to the design.

Measuring Success

Success is easily measured in the field of green building, especially when it comes to measurable efficiency savings for energy and water. Indicators of success might include:

- Green materials usage rates in local new construction and renovations
- The local availability of green building materials
- The number of local LEED® certified buildings and Accredited Professionals
- The number of people employed in, overall economic contribution of, and growth in local green construction related industries
- The amount of construction waste being diverted, or measureable decreases in construction related waste production
- The profitability of private green building projects and affordability of public projects

Harder to measure, but equally important,

are more subjective indicators of success, such as perceived local quality of life, health and well-being of building occupants, aesthetical contributions of green buildings, and community pride.

The environmental soundness of each building material, and even whole buildings, can also be quantitatively measured through "life-cycle assessment." Life-cycle assessment is an analytical process where a product, in this case a building material, is evaluated throughout its entire life for its environmental impact. This includes all natural resources, pollution, and environmental degradation involved its production, shipment, use, and eventual disposal.

Fortunately, simplified models and computer-based systems have been developed, and life-cycle assessments have already been completed for many construction products. Similar tools exist for calculating specific impacts, such as greenhouse gas contribution, and can easily be located through websites such as the US Green Building Council's "Resources" page.

Recommended Resources:

US Environmental Protection Agency (EPA) — Green Building
<http://www.epa.gov/opptintr/green-building>

US Green Building Council — Resources
<http://www.usgbc.org/resources>

Additional Resources:

US Green Building Council — For Governments
<http://www.usgbc.org/DisplayPage.aspx?CMSPageID=1779>

A Green Playbook for Local Governments
<http://www.greenplaybook.org/>

California — Sustainable Building Toolkit
<http://www.ciwmb.ca.gov/Greenbuilding/Toolkit.htm>

A Sourcebook for Green and Sustainable Building
<http://www.greenbuilder.com/sourcebook/>

Field Guide for Sustainable Construction
<http://renovation.pentagon.mil/sustain-fieldguide.htm>

Building Design and Construction Network
<http://www.bdcnetwork.com/>

Green Building Forum
<http://www.greenbuildingtalk.com/>

Greener Buildings
<http://www.greenerbuildings.com/>

For access to comprehensive information on green building materials, try the following links:

EPA Comprehensive Buildings and Construction Resources Page
<http://www.epa.gov/epp/pubs/products/construction.htm>

US Green Building Council Green Building Links Web Page
<http://www.usgbc.org/DisplayPage.aspx?CMSPageID=76>

Green Building Pages — Information Resources and Green Product Locator
<http://www.greenbuildingpages.com/>

GreenSpec®-Listed Green Building Products
<http://www.buildinggreen.com/menus/index.cfm>

To locate salvaged, recycled, and regional building materials, begin here:

Building Materials Reuse Association National Directory
<http://www.buildingreuse.org/directory/>

EPA Comprehensive Procurement Guidelines Material Supplier Database
http://cpg.epa.tms.icfi.com/user/cpg_search.cfm

Green Building Pages — Information Resources and Green Product Locator
<http://www.greenbuildingpages.com/>

To locate rapidly renewable materials, begin here:

Green Building Pages — Information Resources and Green Product Locator
<http://www.greenbuildingpages.com/>

To locate sustainable forest products, begin here:

Forest Stewardship Council, United States Green Building Web Page
http://www.fscus.org/green_building/

US Green Building Council Green Building Links Web Page
<http://www.usgbc.org/DisplayPage.aspx?CMSPageID=76#3>

Green Building Pages — Information Resources and Green Product Locator
<http://www.greenbuildingpages.com/>

To locate energy efficient building technology (e.g. heating, cooling, electrical, insulation, and windows), begin here:

EPA and US Department of Energy — Energy Star Qualified Products Directory
http://www.energystar.gov/index.cfm?fuseaction=find_a_product

Greenguard Environmental Institute — Greenguard Product Guide
<http://www.greenguard.org/Default.aspx?tabid=12>

Green Seal — Lists Environmentally Certified Products (windows and doors)
<http://www.greenseal.org/findaproduct/index.cfm>

Green Building Pages — Information Resources and Green Product Locator
<http://www.greenbuildingpages.com/>

To locate water efficient hardware, begin here:

EPA Watersense Program — Directory of Water Efficient Products
<http://www.epa.gov/watersense/>

To locate non-toxic substances (e.g. solvents and adhesives), begin here:

South Coast Air Quality Management District (AQMD) — Green Solvent Database
<http://www.aqmd.gov/rules/cas/prolist.html>

Greenguard Environmental Institute — Greenguard Product Guide
<http://www.greenguard.org/Default.aspx?tabid=12>

Green Sea I— Lists of Environmentally Certified Products and Services
<http://www.greenseal.org/findaproduct/index.cfm>

GreenSpec®-Listed Green Building Products Directory
<http://www.buildinggreen.com/menus/>

For more information on life-cycle assessment, check out the following:

US Environmental Protection Agency — Life-Cycle Assessment 101
<http://www.epa.gov/ORD/NRMRL/lcaccess/lca101.html>

US Environmental Protection Agency — Life-Cycle Assessment Resources
<http://www.epa.gov/ORD/NRMRL/lcaccess/resources.html#EPA%20Documents>



Green Building Case Study: Portland, Oregon Green Building Campaign Reaps Rewards

Portland has established itself as a national leader in green building. With 36 LEED® certified buildings, Portland currently ranks with cities such as Chicago and Seattle, known for their leadership in green building and distinguished by the large numbers of green buildings they contain.

In 2001, Portland adopted Resolution No. 35956, which mandates LEED® certification for all City-funded construction and major renovation projects. This policy also formalized the efforts of Portland's newly formed Office of Sustainable Development, prescribing proactive engagement with the public and green building stewardship. Also developed was the "Green Investment Fund," to provide grants for green building projects.

In 2005, Portland adopted Resolution No. 36310, which strengthened the previous policy, increasing the requirement for new City construction projects to LEED® Gold certification, and also requiring existing City buildings to be brought up to LEED® Silver certification.

Portland has a comprehensive outreach program, and offers free technical assistance to those interested in participating in their booming green building economy. Through their Office of Sustainable Development and its website they offer an abundance of information and organize regular outreach efforts.

Green building owners have reported lower energy bills and, in many cases, reduced operation and maintenance costs as well. Portland is now reaping the fruits of its bustling green construction economy, with the infrastructure soundly in place for continued success in efforts toward sustainable development.

For further information:

Portland's Green Building Program: <http://www.portlandonline.com/OSD/index.cfm?c=ebeib>

GreenBuild Expo: <http://www.greenbuildexpo.org/About/archives.html>

LEED Projects: <http://www.usgbc.org/LEED/Project/CertifiedProjectList.aspx?CMSPageID=247>



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THIS NOTE IS LEGAL TENDER
FOR ALL DEBTS, PUBLIC AND PRIVATE

Anna Escobedo Cabral
Treasurer of the United States.

Anna Escobedo Cabral
Treasurer of the United States.



(3h) Green Procurement

The United States has the largest and most technologically powerful economy in the world, with a per capita GDP of \$46,000 (US CIA 2008). The ability for local governments to make a difference is enormous.

Green procurement — buying environmentally friendly products wherever possible — is one of the easiest strategies to implement at the local level, as it can be done incrementally and as supplies or equipment are purchased.

A key advantage of green procurement is that its principles are applicable at almost every level of commercial activity — from the single-person household to the largest organization in the world. They can be applied to almost every aspect of an organization: transportation, energy supply, water use, packaging, office materials, and waste to name but a few.

The advantages of implementing green procurement include:

- Easy to initiate and grow over time
- Relatively inexpensive and at times can often lead to net savings
- Often improves employee health and performance
- Often reduces existing and potential liabilities
- Stimulates the market for environmentally preferable products.

Best Practices and Solutions

The US Environmental Protection Agency (EPA) introduced the Environmentally Preferable Purchasing (EPP) Program in

1993, helping federal agencies to “use sustainable practices when buying products and services.”

Measuring Success

Some specific indicators for green procurement are:

- Amount and degree of post-consumer recycled products (e.g. office supplies, bags supplied by vendors, etc.)
- Number and volume of cleaning products purchased from an approved green supplier
- Use of non-toxic carpets, paints, and sealants
- Percentage of energy-efficient lighting, equipment, and heating/air conditioning systems
- Percentage of water-efficient fixtures

Recommended Resource:

For full access to all the tools available please visit EPA's EPP website:
<http://www.epa.gov/epp/tools/index.htm>

Additional Resources:

EPA's Comprehensive Procurement Guidelines Supplier Database is a searchable guide to providers of everything from bicycle racks to signage:

http://cpgepa.tms.icfi.com/user/cpg_search.cfm

EPA's "EPP Assistant" allows users to quantify and prioritize their green purchasing efforts through a life cycle assessment:

http://www.earthster.org/about_earthster/phases/phase_i

The "General Services Administration's SmartPay® Purchase Card Training" is a tool developed by GSA to help federal purchasers properly design and carry out a purchasing plan:

<http://www.fss.gsa.gov/webtraining/trainingdocs/smartpaytraining/>

The "Federal Green Construction Guide for Specifiers" is a Comprehensive guide to procuring green building products and construction services:

<http://www.wbdg.org/design/greenspec.php>

The "Green Cleaning Pollution Prevention Calculator" calculates the projected environmental benefits of purchasing and using green janitorial services and products:

<http://www.ofee.gov/janitor/index.asp>

The "Hybrid Electric Vehicle (HEV) Cost Calculator Tool" and the "Flex Fuel Vehicle (FFV) Cost Calculator Tool" allow an organization to compare the costs, benefits, and emissions of HEVs and FFVs, respectively, to those of conventional vehicles:

http://www.eere.energy.gov/cleancities/hev/cost_calc.html

http://www.eere.energy.gov/fleetguide/cost_anal.php?0/E85*Flex*Fuel/

The Paper Calculator allows an organization to compare the environmental impacts of different paper choices:

<http://www.edf.org/papercalculator/>





(3i) Hazard Mitigation

Hazard mitigation strategies are essential to ensuring human health and safety and should be part of a comprehensive municipal sustainability plan. Although specific concerns will vary widely by region and locality, there are a number of potential issues to consider to minimize natural and human-created risk. Natural disaster, chemical hazards, and widespread disease have potentially significant impacts on human health, local economy, and the natural environment.

Invasive species, pollution, climate change, pandemic and epidemic disease, resource extraction and over-harvesting, chemical or nuclear spills, and a host of other potential hazards deserve attention when a community is in the process of creating a comprehensive plan.

Best Practices and Solutions

Hazard mitigation requires a comprehensive approach in order to be effective. Large-scale hazards have large-scale effects only when scenarios are not planned for, or existing plans fall short in addressing the scope of the problem. In order to be prepared for as many situations as possible, it is necessary to consult existing literature on the topic of hazard mitigation and emergency preparedness.

Measuring Success

Because of the nature of disaster management, the only true test of success occurs when disaster strikes. In order to gauge the preparedness of a municipality for disaster, benchmarking offers the second best alternative. By using the resources offered in this guide, as well as consulting widely with other municipalities, emergency managers can improve existing emergency services and ensure comprehensive coverage of events likely to occur given the region and circumstances of the locality.

Recommended Resources:

Community Vulnerability Assessment Tool. In collaboration with the Federal Emergency Management Agency (FEMA), the National Oceanic and Atmospheric Administration (NOAA) produced this tool to determine and prioritize vulnerability hazards.

<http://www.csc.noaa.gov/products/nc-haz/startup.htm>

Planning Locally for Climate Change
Climate change guidebook produced by
the Climate Impacts Group at the Univer-
sity of Washington and members of King
County, Washington, in collaboration
with ICLEI.

<http://www.iclei.org/index.php?id=7066>

Additional Resources

EPA Regional Vulnerability Assessment:
<http://www.epa.gov/rev/>

EPA Events of National Significance page
studies major disasters and incidents:
[http://www.epa.gov/emergencies/con-
tent/learning/national_response.htm](http://www.epa.gov/emergencies/content/learning/national_response.htm)

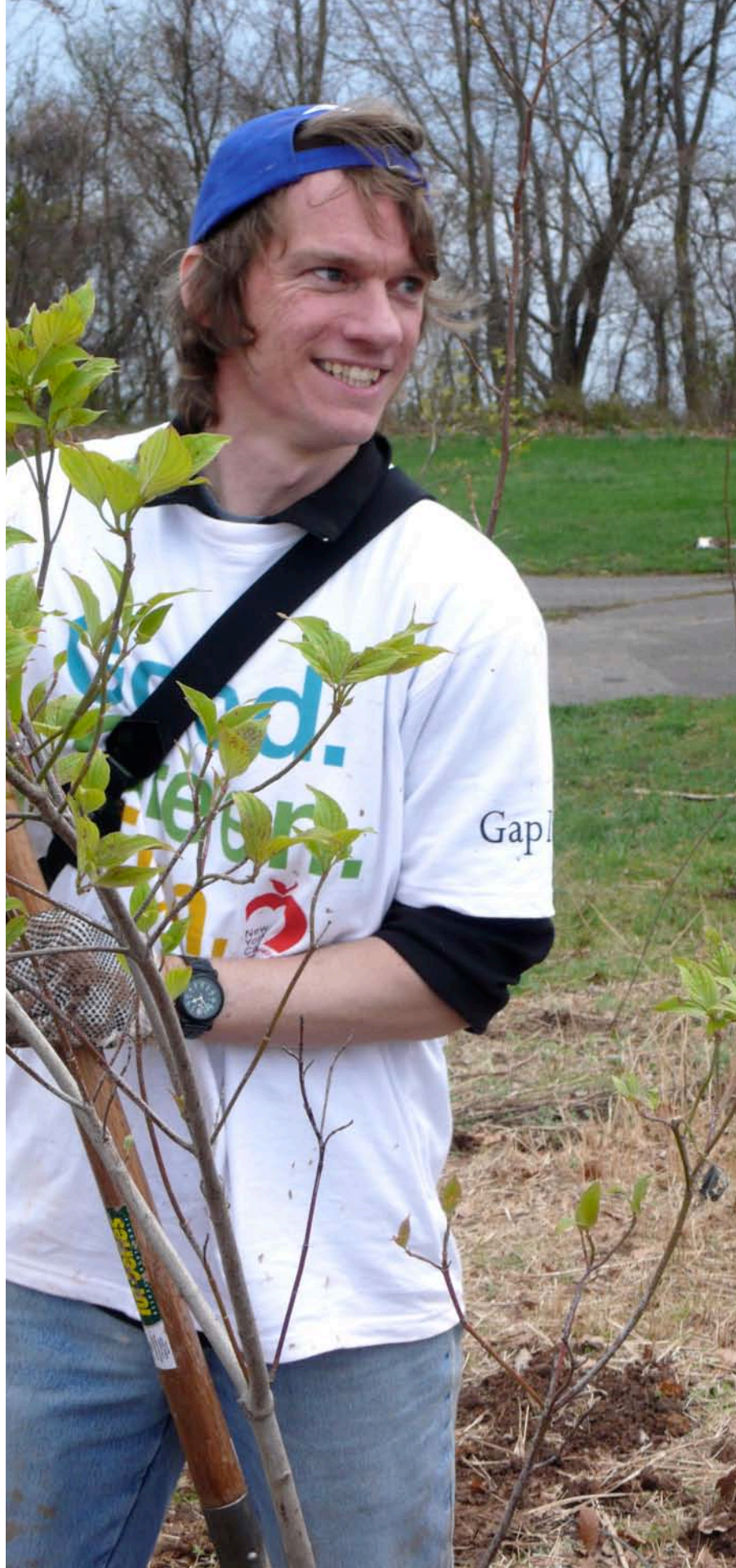
Center for Disease Control Natural Disas-
ters and Extreme Weather: [http://www.
bt.cdc.gov/disasters/](http://www.bt.cdc.gov/disasters/)

ICLEI Global Platform for Disas-
ter Risk Reduction- [http://www.
iclei.org/index.php?id=6880&tx_
ttnews\[backPid\]=6877&tx_ttnews\[tt_
news\]=2008&cHash=a05f248d7d](http://www.iclei.org/index.php?id=6880&tx_ttnews[backPid]=6877&tx_ttnews[tt_news]=2008&cHash=a05f248d7d)

UN World Conference on Disaster Reduc-
tion:
<http://www.unisdr.org/wcdr/>

Additional resources may be found on the
websites of municipal governments such
as the City of Portland Office of Emergen-
cy Management office:
[http://www.portlandonline.com/oem/in-
dex.cfm?c=28988](http://www.portlandonline.com/oem/index.cfm?c=28988)

The Santa Barbara Office of Emergency
Services and Sarasota County site are also
useful:
[http://www.scgov.net/EmergencyServic-
es/EmergencyManagement/emergency-
management.asp](http://www.scgov.net/EmergencyServices/EmergencyManagement/emergency-management.asp)
[http://www.santabarbaraca.gov/Resi-
dent/OES/](http://www.santabarbaraca.gov/Resident/OES/)



4

Conclusion: Moving Beyond Planning to Action

Regardless of budget, population, or demographics, creating a new municipal sustainability plan (or reorganizing current plans), is just the first step in a much larger process.

Sustainability planning is multi-faceted. Successful implementation requires follow-through.

Local governments, as opposed to state and federal, are best equipped at identifying community needs and implementing programs to address them. The goal is to move towards solutions — not away from problems. Overall, four considerations are key to consider in the sustainability planning process:

- Leadership
- Community involvement
- Metrics and goals
- Linking goals to funds.

The first step in creating a sustainability plan is dedicated leadership. Leadership can sprout from a variety of sources: actors internal to the government; community groups, or even one dedicated individual capable of creating the vision and mobilizing further activity. However, once initial incentives are established, sustainability needs to move beyond just words and be officially incorporated into government policy and strategy.

As emphasized within this handbook, establishing metrics and goals is essential to

the success of any program. Metrics and goals should not be established only for each individual program and sector but should be applied via a holistic approach that links all governmental activity to the cause of sustainability. Once some overarching goals have been set, a series of measurement tools should be employed to establish baselines (e.g. a greenhouse gas inventory) and future assessments should be undertaken to ensure that targets are in line to be met. From the baseline metric, all governmental and community programs and sectors can and should be active participants in the sustainability process.

As illustrated throughout the report, there are a multitude of approaches to ensuring successful implementation. Whether proposed changes are internal to the government or rely on community participation, our research suggests that broad support and participation from the community is essential to both planning and implementation.

The success of any sustainability plan relies on the education, commitment, and action of not only the government, but residents, businesses, and civic organizations as well. Strong cross communication will create feedback loops, best practices, and help to ensure increased buy-in, participation, and ultimately the success of your sustainability plan. This is not a surprising finding, but it emphasizes the importance of outreach and community education throughout the process of plan development as well as during implementation.

Change can be a hard sell, so here we examine some drivers of change in some of the sample cities from our research and suggest some techniques and options for intra-governmental action as well as com-

munity development to garner enthusiasm for proposed sustainability plans.

Plans may be driven by the community, the government, or start one way and end up another, but the most important ingredient for success is engagement. Some drivers of plans include:

- Public environmental concerns. Concern about climate change or air pollution or a host of other environmental issues often spurs community members to push for a more comprehensive approach to planning (e.g. Westchester County, New York).
- Single event to kick-start and educate. Community interest in greening the town at a small scale led to a conference, which created a much broader interest (e.g. Chequamegon, Wisconsin). Town Hall meetings have proven to be an effective venue for these issues to be raised and discussed (e.g. Burlington, Vermont and Greensburg, Kansas).
- Key players in one government department. One key department within the government (in this case, water) with people used to working together started thinking about how they could make it better (e.g. Cleveland, Ohio).
- Top-down priority setting. Decisions can be made by a mayor or city council to make sustainability a priority, to hire consultants, to look at energy efficiency, to look at the cost-benefit analysis of certain programming options or to establish a task force (e.g. Lancaster, Pennsylvania and many more).
- Willingness to try a pilot project. Start with energy efficiency (conservation generally pays for itself) and realize there are other ways to save money (e.g. Ann Arbor, Michigan).
- Empower a champion. Select/appoint

one particular member of the local government with an interest, and this can expand into a whole new department. In Ann Arbor this is so well developed that the strategic planning department has members from all sectors, and although they might not brand themselves as such, they are the “policy center” for the government.

- Hire an intern from a local university. Find someone who can look at current practices and make recommendations (e.g. Bowling Green, Ohio).

(4a) Goal-Setting, Targets, and Performance Measurement Strategies

The old adage, “If you can’t measure it, you can’t manage it” holds true for sustainability planning. Once your plan is implemented, it is important to gauge whether or not progress is being made towards the goals of the plan in the most efficient and effective way possible. This can be achieved through benchmarking.

Objectives of each individual plan will vary dependent upon the thrust of the plans put forward, and most municipalities have goal-setting structures in place. It may be as simple as a new mission statement that incorporates sustainability that can drive decision-making, be a list of goals and objectives, or specific measurable targets.

Targets are more difficult to establish and in some cases it is important to begin by tracking data. In Ann Arbor, Michigan their annual “State of Our Environment Report” highlights the direction their indicators are heading in. Burlington, Vermont started their planning process in 2000 based on a 10-percent greenhouse gas reduction by 2005 and made goals based on this overarching target. Ultimately, goals, targets, and indicators are important to create accountability and, therefore, public support. A few ways to do this include:

1. Create accountability by identifying by assigning responsibility.

- Invite mayors and governors to highlight your town's goals.

- Create top-down accountability: If a Mayor makes a public commitment or signs onto the Mayor's Climate Protection Agreement (already hundreds of US mayors have done so), this creates accountability and garners interest on a larger scale. Also, it is an indicator to government members that this is a priority and this top-down approach may cause them to react in a way that community petitions may not.

- Craft partnerships with shared goals: Many municipal plans start from community activities, volunteer organizations or non-profit organizations, and then the municipality jumps on board. This is a more conservative approach, because community support is built in to the process.

- Increase intra-governmental communication: Appoint one coordinator to get people from various departments to start communicating about initiatives can streamline actions and result in a more holistic but efficient approach.

- Identify/appoint a specific person in charge of data collection.

- Create a multi-disciplinary board or committee: Such a board or committee should not simply consist of government members but also of community leaders, members of businesses, or other members of the public — such as university faculty, concerned parents, or retirees. The more people that are invested in the sustainability plan process, the greater the odds of success and pressure from all sides to stick to the agreed upon goals and targets.

- Utilize existing local assets. Partnerships with universities have been essential in many parts of the country and hiring undergraduates, interns, or graduate students can be an inexpensive way to research issues of interest.

2. Create Accountability through funding approaches.

The most commonly cited barrier to sustainability planning, even in regions where there is support for it, is funding. However, obtaining funding can also be viewed as an opportunity to get as many people involved as possible that, as suggested above, is likely to increase overall participation and ultimately approval and success.

Needs Assessment of Local Business: One city surveyed its primary businesses and performed a needs assessment. If businesses believe their needs will also be addressed by a sustainability plan, they may be more likely to participate and support the endeavor. This can assist with legitimacy in the public eye, as addressing economic development is always an important budget priority. Brownsville, Texas is an excellent example of this.

Grants. Opportunities for grants exist at the state, federal, and local level. Private foundations are also a source of funding, but non-profit organizations supporting urban sustainability are more common. See section 11a for suggested granting agencies.

Life Cycle Costing and Benefit-Cost Analysis. Ann Arbor, Michigan was able to get a new staff member despite overall cuts, because they showed that as long as their new energy policy staff member could save them one percent of their annual energy costs (which was easily done and exceeded in the first year), it would pay for the salary of that position.

3. Record targets in a matrix for easy reference.

Plans become more powerful as they include more targets and measurable indicators, because this provides the ability to demonstrate progress and manage adaptively. Some targets, such as those dealing with air quality and water quality are already well established by EPA and other agencies.

However, many municipalities and counties have gone on to develop far more detailed targets to include a variety of inter-related sectors. Two exceptional examples are PlaNYC's quantitative targets at: <http://www.nyc.gov/html/planyc2030/html/plan/plan.shtml>

Ann Arbor's State of the Environment Report at is another excellent example at: http://www.a2gov.org/government/publicservices/systems_planning/Environment/soe07/Pages/ExecutiveSummary.aspx.

A website or other media and communications tools are particularly helpful in disseminating this information to the public. Access to this information is important for transparency, accountability, and compliance. These websites are particularly helpful when they are paired with educational tools and suggestions (to individuals, businesses, and community groups) how they can do their part to assist in addressing that particular indicator.

(4b) Wrapping up and Moving Forward

The challenges we face at the local level — from ensuring the provision of critical services to meeting future threats — are substantial. But as we hope this handbook has shown, ideas, approaches, and resources to foster sustainability abound.

There is no single magic bullet or right answer to the puzzle of sustainability planning — but there is a growing array of approaches that have worked for communities of every size and shape. Although the approaches are diverse, the best plans all take a comprehensive view to planning that aims to simultaneously improve efficiency, lower costs, and provide for future generations while meeting the needs of today.

Every city, town, and county faces its own set of challenges and opportunities. And every community also has a unique mix of resources, talent, and ideas to create solutions with. But as the saying goes, before you cut, measure twice.

5 Methodology

This handbook is based on information from two reports that we created: one that compared and analyzed information from fourteen sustainability plans and a second that assessed information obtained from interviews with planners and officials in sixteen local governments without sustainability plans.

These reports used a non-representative sample of local governments that were selected for variety rather than representativeness. We wanted to select localities in all ten EPA regions as well as places ranging in population from small towns to small cities.

We believe that analyzing the successes and challenges of this cross-section of communities from across the nation can help us better understand the benefits of sustainability planning and the barriers that may be preventing more communities from adopting this approach.

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